

State Limits Crime File Access, 42 Agencies Ineligible

(Continued from Page 1)

thorized to view the fields, has protested its exclusion and is "negotiating with the Criminal History Systems Board to see if we can qualify within the interpretation of the law," according to Leonard F. Cronin, New England regional director.

"This is the first time to my knowledge that we've had a whole state kept from cooperating with us," he commented.

"I don't know that you can say the Civil Service has criminal justice as the prime reason for its existence; it's one of the aspects of it," he said.

Cronin pointed out that the Civil Service does personnel investigations for most of the government services, including employees of the secret service, the treasury, intelligence, bureau of narcotics and dangerous drugs, many agencies which are "law enforcement agencies and which themselves have the right to review the records — yet we're frozen out."

Case Disposition

"This is a matter of very serious concern to us. We have every government employee fingerprinted the day he's appointed or even before, and it's important for us to know not only whether a person was arrested, but what the disposition of the case was," Cronin remarked.

For example, the charge of disorderly conduct "can cover a multitude of sins, from marital fights to preliminary charges filed for sexual perversion, so we want the details. Just knowing a person has been arrested isn't enough information," he said.

"A lot of people are complaining," noted Hank Shafran, assistant to the director of the Committee of Law Enforce-

ment and Administration of Criminal Justice. "The problem is that up until this point anyone could walk in anywhere and get these records, so the complaints are coming from persons who previously had access to these records," he observed.

Old System Had 'Everything'

Under the old system, records contained "everything," including arrests without convictions, and mistakes, according to Shafran.

Now, only selected information is being converted, and there will be a mechanism to expunge mistakes, noted Director Arnold Rosenfeld.

In order to ensure that the file does not contain inaccurate or irrelevant information, the new law specifies that "criminal offender record information shall be restricted to that recorded as the result of the initiation of criminal proceedings or of any consequent proceedings related thereto."

"It shall not include intelligence, analytical investigative reports and files, nor statistical records in which individuals are not identified and from which their identities are not ascertainable."

The criterion for conversion to a preliminary data base of the Criminal Justice Information file is all major motor vehicle violations and all felonies and misdemeanors, except for drunkenness, according to Steve Long, systems engineer for the committee.

In any case, juvenile records are excluded from the file, he noted.

In addition, the board is only listing those cases pending in court as of Jan. 1, 1973 which show a previous conviction in court, Long explained.

The case must also have a fingerprint card on file at the State Police Massachusetts Bureau of Identification," he said.

No first offenses will be included in the system until it is completely up and running, he added.

Right of Review

The law also provides individuals with the right to review their criminal records and to challenge the accuracy or completeness of the information.

If the agency declines to "purge, modify or supplement the record," the individual may take his case to the security and privacy council, which is charged with

"continually studying the use of the system, and make recommendations concerning questions of individual privacy and system security . . ."

Furthermore, each agency receiving criminal offender record information is required to maintain a list of the agencies or individuals to which it has released or communicated such information.

The Criminal History Systems Board is empowered by the legislation to supervise the participation by state and local agencies in any interstate system for the exchange of such information, and is charged with making the system compatible with other state information systems.

The board may limit the "number and placement of such terminals to those for which adequate security measures may be taken and as to which the board may impose appropriate supervisory regulations."

The board is currently evaluating proposals for hardware for the system, and has been working on the software for the conversion of the data base for about a year, Long said. A Digital Equipment Corp. PDP-11 is being used in the conversion process.

Are CPU Probe Points Proprietary Information?

(Continued from Page 1)

through better workload balancing or a reconfiguration of the hardware itself.

At the CPEUG meeting, John E. Rehbehn of the Naval Command Systems Support Activity (Navcossact) held that a large base of sound technical information is essential to a monitoring project, especially in a multivendor environment.

To support its own work, he said, Navcossact has developed a computerized library of points, and their meanings, for a wide range of mainframes and peripherals. The listings show who identified the point and whether its proposed use is "untried" or "reliable."

As far as Navcossact is concerned, the library and its supporting software — currently implemented on a Univac 1108 — is available, at least to all government users, through the Federal Simulation Center, on a minimal cost-reimbursement basis.

Rehbehn noted the list entries had been gathered from mainframe vendors, from independent peripheral makers, from Testdata Corp. (which markets a range of measurement tools) and "informally" from Compress, Inc.

A Compress representative at the meeting, William Dowling, reacted sharply to the announced availability of the probe point library. He argued that the information was proprietary to Compress and that unrestricted disclosure could harm his company.

Later, as part of his formal presentation, Honeywell's Dr. Clair Miller raised the same basic argument (but with a twist) and then added some advice for those

who would try to gather probe point information in a casual way.

Data acquired from a vendor's field engineer might be correct, he admitted, but not complete enough for the user to properly interpret the meaning of impulses — or their lack — at a suggested point.

The only reliable source of complete probe point information, according to Miller, is the original manufacturer of the mainframe or peripheral unit, and not the monitor vendor. But "since complete disclosure of all possible probe points and their meanings would amount to disclosure of the system's architecture," he noted, it is unlikely the manufacturers would release this information volun-

tarily.

Nonetheless, mainframers recognize users' growing interest in evaluation and they are concerned about "uneducated" users making mistakes in attaching probes.

That may lead, Miller speculated, to the inclusion of monitoring units as part of the complete computer system as it comes from the manufacturer, or the clear identification of basic points to which users can safely attach probes from their monitors.

More information about the Navcossact probe point library programs is available from Ruth Bromen, Federal Simulation Center (AY), Washington, D.C. 20330.

DA Says DP Used to 'Shuffle' \$1.5 Million Out of N.Y. Bank

(Continued from Page 1)

Currently, he said, the bank feels false information was entered into the system from the bank's Park Avenue branch where Steffen worked.

In periodic audits, the manual documents apparently checked out with the computer-based totals, and therefore were thought to be correct, officials indicated.

The embezzlement was so well hidden within the computer system that District Attorney Hogan said the crime might never have been discovered if Steffen's name had not come up in an investigation

of a large bookmaking operation here.

Apparently, Steffen and his family (wife, two daughters) lived on his \$11,000 salary and his alleged embezzlement funds went for large-scale gambling which reportedly involved bets of as much as \$30,000 daily on horse races or professional sports.

Several weeks ago the district attorney's office raided a large bookmaking operation that had been under investigation by state, local and federal authorities for some time.

In poring over the records confiscated in that raid, it was discovered that Steffen was making daily bets of around \$30,000.

The size of the embezzlement is said to be one of the largest, if not the largest, in history from a savings bank even though there have been some larger at other types of banks.

In addition, some officials indicated an embezzlement of this size would probably have been noticed much sooner if the system had been entirely manual.

Pick Your Documents!

ALBUQUERQUE, N.M. — Data from over two million documents fills a data base at the Technology Application Center (TAC) at the University of New Mexico.

The National Aeronautics and Space Administration initiated the center nine years ago as part of its Technologic Utilization Program, designed to apply technology to every-day problems. People in industry, business and government have access to the center.

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Worried About Future Support

Move to 3d-Party Installation Puts Firm 'Out on Limb'

By Michael Weinstein
Of the CW Staff

EAST PEORIA, Ill. — From a "safe," IBM rented 16K 360/30 and two 2311s four years ago at \$5,900/mo," Chris Hoerr & Sons has "gone and purchased third-party, independent core, foreign peripherals and outside hardware installers," and the firm is worried.

The move to outside sources was done in spite of efforts of local IBM personnel

Configuration	Cost
128K IBM 360/30 (third party)	\$1,400/mo
174M bytes three ITEL files two-year lease	\$1,800/mo
1403N1, 2841 Control Reader, Cartridge, Fixed Term	\$1,602/mo
Ten 3277s, 3272 Control, 3284 Printer and CICS Entry	\$1,815/mo
Total	\$6,617/mo

Basic System Chosen by Firm

to guide the account into a 370/125, according to Farrell Lord, DP manager.

Even though the third-party system will save the company \$180,000 over the next five years, Lord is worried about future support and the finger pointing that sometimes occurs in mixed-vendor installations.

"We are out on a limb and the wind is blowing," Lord stated, but "we believe we have decided the correct course for us."

The basic system chosen by Lord has a total rental cost of \$6,617/mo.

Comparable Rental

A comparable 370/125 would have cost Lord \$9,600/mo plus any required software.

While it would probably do a better job for the company, this improvement would not be worth the \$3,000/mo times 12 months times five years, or \$180,000 extra, Lord stated.

Lord said he was the first local user to rent a central processor from a third party and to go on a third-party lease for 2311 disk subsystems.

Support Problems

If Lord is worried about IBM support,

he is equally worried about support problems from smaller vendors further away. Despite fears, contracts have been signed and installation dates set.

"We are out on a limb and the wind is blowing... but we believe we have decided the correct course..."

The core selection was based on two reasons, Lord said. "Peoria is a boondock location and Data Recall has agreed to have Honeywell locally service the core." Further, the Data Recall core was cheaper by about \$2,000, had upgrade capabilities and a transparency switch, he added.

ITEL files were selected even though local service is not available. Lord feels this is "a definite disadvantage, but being able to reassign down units would hopefully get us by. Local service may be available later."

Since that time, Lord feels the market-

March 9, 1973	Data Recall Core Upgrade of 64K for a Total of 96K — Cost \$22,000 Purchased
April 14, 1973	CHCS will add storage protect and interval timer to the CPU
June 9, 1973	Three ITEL 3101 Dual Density Files on a Two-Year Lease, Total Capacity 174 Mbytes — Cost \$1,800/mo
Nov. 1, 1973	(Planned) Additional 32K Data Recall Core Depending on the Outcome of IBM CICS Requirements
Feb. 1, 1974	IBM 3270 CRTs and one Printer
April 1, 1974	Three IBM 3270 CRTs
June 1, 1974	One IBM 3270 CRT
Aug. 1, 1974	Two IBM 3270 CRTs

Installation Dates for Chris Hoerr & Sons

ing arm of IBM has treated the firm as "black sheep" while IBM maintenance personnel have offered continued excellent performance.

"IBM has supplied many subtle and some not so subtle pressures on us such as

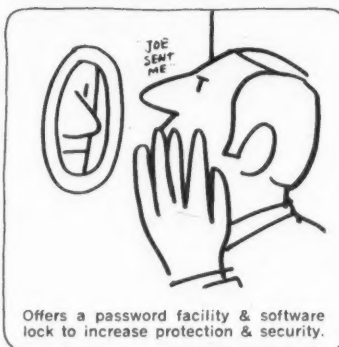
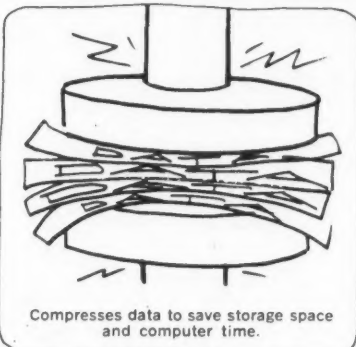
long response time to questions concerning DOS, etc.," he added.

Despite these feelings, the substantial savings realized has caused many users in the area to consider breaking the cord and going to "other" sources, he noted.

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Intelligent Terminals for Remote

Key-Disk Best for Central Uses

By Michael Weinstein
Of the CW Staff

ANAHEIM, Calif. — In evaluating alternatives to keypunch operations, shared processor key-to-disk is better for a centralized operation while intelligent terminals provide superior operations when data is coming in from remote locations, according to users at Computer Caravan/73's data entry panel here.

A restriction mentioned by users of key-to-disk systems was that key stations could not be located more than a few thousand feet from the shared processor.

Also, because of the central computer it was necessary to have computer expertise nearby in case of system problems.

But this restriction had minimal impact compared to the benefits users found.

Jim Feeley of Philco-Ford told

how he had taken six applications and divided the input operations. The first group was entered on standard keypunch while the second was entered

Caravan/73

using an Inforex key-to-disk system.

A comparison of the time needed to enter all data indicated that key-to-disk had taken 45% less time than keypunch, according to Feeley.

Another advantage of key-to-disk, Feeley explained, was the ability of the central shared processor to perform functions other than entering data.

At Philco-Ford the data-entry system produces reports showing the amount of data entered by each operator with error rates. Using these and similar reports, Feeley stated he is able to evaluate individual operators and test various formats for source documents.

"Probably the most important consideration to management has been the ability to reduce the number of operators

needed," he added.

With the system's ability to provide for verification, balancing, etc., "we have been able to get the same throughput with eight operators that used to take 13 keypunch operators," he attested.

But despite these advantages, Feeley appeared hesitant on the reliability and sticking power of key-to-disk operations.

For example, he advised users to set input formats in standard 80 columns. The advantage of this was that if the shared processor did develop problems it would then be easy to go directly back to keypunch either for short periods such as crashes or other unforeseen problems.

Contrasting Feeley's support for key-to-disk, Lou Morton told users why his company had gone to intelligent terminals.

Morton, a programmer/analyst for Kaufman and Broad, explained that his firm was in the home construction business with many remote offices with small non-computer-oriented staffs.

"On one hand we needed to get fast turnaround of information," he related, "but on the other we did not want to put a

How to Change Smoothly

ANAHEIM — When the computer department wants to install a superior system, it should not give other departments excessive leeway to bicker, Jim Feeley of Philco-Ford told users at a Caravan/73 session.

"There is a natural hesitancy of other departments toward change," he related.

"For example, when we were going to start key-to-disk operations, other departments did not want to give up keypunch operations."

The main reason for the desire to remain static, cited by Feeley, was that the departments had grown accustomed to keypunch operations and were frightened that key-to-disk might endanger current jobs.

"Rather than enter into arguments with each user department, the computer facility should make the change and have done with it," he advised.

If changes come as directives as opposed to proposals open for discussion, users will see smoother transition periods, he concluded.

computer out in the field."

Morton's first attempt at getting data to the Los Angeles headquarters was to install paper punch equipment at each branch office. After the tape was prepared, it was mailed on Monday and if all went well it arrived in Los Angeles by Wednesday, he related.

"But this was not an adequate answer, as we had to spend sometimes up to eight hours splicing and sorting tapes. Further, as the remote sites could not read the punch marks, the error rate was too high."

At this point, Morton moved to Sycor intelligent terminals with "gratifying results."

Sycor was chosen, he related, because at the time "we needed a printer at the branches and Sycor was the only system considered with this capability."

The advantages of intelligent terminal operation were noticed immediately, Morton said.

It was very easy to program the terminals so that a clerk could call the program wanted. On the screen an image of the form to be filled in was viewed by the operator who then merely typed in the data required.

If an error occurred, a diagnostic was visible immediately and the correction was effected, he added.

Outside Software? Check Legal Aspects, Functional Abilities, Watch for Frills

By Ronald A. Frank
Of the CW Staff

HOUSTON — Users considering commercial software packages should fully investigate the legal and functional aspects of the program before making a decision.

In the area of functional capabilities, it should be possible to integrate this software into the hardware and operating system of the mainframe without causing major upheavals, users at the Computer Caravan/73 related.

Protecting Oneself

In the legal area the user may be stuck with the standard software lease forms of the vendor.

But if clauses in the vendor's contract displease the potential user, it would be better to straighten out any problems before installation, rather than challenging an agreement after the fact, the users said.

Many of the available software packages contain more "frills" than are required by the user, the panelists agreed, and this adds unnecessary cost.

The user who installs outside software should demand that the vendor insure the system is properly supported. Software houses often fail to provide the required support so the user has to involve personnel from his own staff.

The amount of assistance or support that can be expected from the supplier is often tied directly to the terms of the contract. All user agreements for the utilization of outside packages should be reviewed by a lawyer, according to David Larrabee of Getty Oil Co.

"You can train a lawyer to think like a DP manager," Lar-

abee said, "but if you are depending specifically on the terms of your software agreement, then you probably are already in trouble with your system."

Consider Alternatives

One of the major factors in selecting commercial packages is the cost to the user. The proposed software should be compared with the price of developing a software capability in-house. And the installation of outside packages should be coupled with an agreement that will require the vendor to supply system updates when necessary.

A typical problem with an outside package was described by C. Metcalf of the Bank of the Southwest. For the past two years, the package under discussion (a payroll system) caused tax problems with year-end financial statements, Metcalf said.

The package cost the user about \$1,200/yr and this presumably included latest updates. But each year, as part of the year-end financial statements, the user found the package was simply dropping the names of employees who had been terminated during the year. Although a relatively simple fix was developed in-house by the user, and relayed to the software supplier, the information was apparently not passed on to users of the package, Metcalf said.

The only time that software contracts and their provisions become important is "when the whole thing goes up in smoke," he affirmed.

Metcalf cautioned users not to send a staff programmer into the field to evaluate a package under consideration. The DP manager is the one who is going to have "to live with" the software, and its potential management and other operating problems.

Making Your Own Music

HOUSTON — Data users in this state have their share of problems because there is no state regulatory agency to oversee local phone companies. City fathers in each town decide what rates the phone company can charge, according to Dr. Dick Simmons, director of DP at Texas A&M University.

Southwestern Bell makes more money in Texas than in any other area and it has more lawyers in this state to deal with local town governments, Simmons charged.

There are about 150 phone companies including independents in the state and many of these have never had to provide service to data users, Dr. Simmons said.

"We deal with 15 independent phone companies," Joe Hopkins told attendees at a Caravan session. "These firms don't run into data every day, and you have to talk to them on a very low level," said Hopkins.

One user recited his own tale of woe in attempting to get a conditioned private line from an independent phone company. "They didn't even have the necessary specs to condition the line nor the required test equipment," he said.

But rather than taking the time to educate the local independent phone company, the user came up with a unique solution. "We finally rented a wire from Muzak (musical transcription service) and it worked just fine for data," he smiled.

Users See 'Interim' 3705 Overshadowed

HOUSTON — The IBM 3705 programmable communications processor may well be only "an interim machine," according to users at the Computer Caravan/73 here.

Current 3705 users agreed the machine can be more cost-effective "than several 270Xs" when operating in emulation mode." All current 3705 users attending a session on front-end processor selection said they were operating in this emulation mode.

'Just Wait ...'

"When the 3705 begins operating in its Network Control Program (NCP) mode, some very interesting software problems are going to develop for users," according to the session's leader, Dr. Dick Simmons.

Although the 3705 may be competitive today, in two to three years it will be overshadowed by advancing tech-

nology, Simmons predicted.

One of the most crucial problems for any front-end user is adequate software, Simmons said. Users should insist on obtaining turnkey systems from the front-end vendor. "And if the supplier can't demonstrate his communications software rather than talking about it, I would be suspicious," he added.

One of the problems in selecting a front end is that most users don't really know "what the final network design will be." Therefore the user should try to get some assurance that the supplier will be able to properly support network configuration expansions, he said.

For critical operating networks where downtime cannot be tolerated, Simmons said two front ends were mandatory.

Describing how easily potential users can misjudge proposed front-end processors, Simmons advised careful evaluation.

"I cannot overemphasize the need to talk to other users. Whenever possible try to talk to an existing user who was not recommended by the supplier," he suggested.



CW Photo by Ronald A. Frank

Remember When?

Haskell Odom from Electronic Memories & Magnetics and Bill Short from Ventex (standing) look over EMM's hourglass display showing the changes in core memory size over the years.

Faster Memories Due**S/3's Lifespan Expected to Be Long, Eventful With Many Enhancements**

ENCINO, Calif. — IBM made a big mistake in that it did not build obsolescence into the System/3, according to David E. Ferguson, Group/3 president, who addressed a workshop of the National Association of System/3 Users recently.

"The S/3 will be with us 30 years from now," Ferguson said, "since the equipment is, at the present time, being used to only a small percentage of its capability."

"Also, the 370 line is really an enhancement of the 360 which means that that particular IBM line could very well reach the 30-year figure. So, it's not so strange that the S/3 will be around for the same length of time."

Ferguson pointed out that when the S/3 was first introduced it had a maximum memory size of 32K bytes (with a possible nine million disk bytes), although 12K and 16K memories were more usual.

More Ahead

"Today the S/3 is an entirely different machine," he said. "It can accommodate 64K bytes in mem-

ory and 50 million disk bytes. In addition, tape drives, an 1,100 line/min printer and equipment to read 80-column cards are available. And there will be more in the future.

"This means, as the S/3 user becomes more and more sophisticated and extends the use of his machine through the utilization of more efficient languages, that the S/3 is really going to be with us for a long, long time."

Software Competition

Unbundling, he emphasized, has stimulated competition in the software field and he stated that a wide variety of application packages other than IBM's would be available to S/3 users in the near future.

"However," he added, "the S/3 is memory-bound at the present time. But it will be only a matter of time before the independent manufacturers come up with faster memories and will have the ability of extending the S/3 beyond its present 64K, regardless of what IBM says now."

DP-Based Techniques Of Risk Prediction Should Aid Business

SANTA MONICA, Calif. — Computer techniques of risk prediction and assessment, formerly used only to examine the financial and technological uncertainties in large-scale defense development programs will be increasingly widely used in business, according to Dr. Eugene P. Durbin of Technology Service Corp.

"Businessmen in highly competitive industries confront decisions at an increasingly rapid rate regarding new products or new production methods where the technological approaches are not well proven. They are also faced with new and rapidly changing social and environmental concerns that further complicate the decision process," Durbin said.

To deal with this new level of complexity, computer-based risk prediction techniques developed for military program managers will soon be supplementing traditional commercial profitability analysis, market analysis and financial planning in business, Durbin added.

"The increasing power of computers allows the use of comprehensive and high-powered mathematical algorithms to compare products and evaluate the relative risks of alternative approaches," he claimed.

"These techniques are being widely taught in the business schools, and as managers brought up on these techniques move up the corporate ladders, use of the techniques will become commonplace in corporate planning."

Two Railroads Consolidate DP for Train, Car Movements

JACKSONVILLE, Fla. — Seaboard Coast Line and Louisville and Nashville railroads have consolidated computer operations for all train and car movements.

Railroad executives said this means all records covering train operations and car movements throughout the approximately 16,000-mile network are transmitted directly into a computer installation here.

This reduces communications requirements by as much as 50% for shippers who previously had to query both railroads to obtain information about shipments, officials said. Both sources furnishing current car location data to many shippers daily resulted in a substantial duplication of effort, they said.

Many major shippers can make inquiries directly into the data banks to obtain freight car movement information, enabling shippers and receivers to schedule orders and deliveries with greater precision and conduct many operations with smaller inventories, they added.

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Cobol Standard Proposal Draws 481 Comments, Changes Accepted

(Continued from Page 1)

• File Status — Provision was made in all three I/O modules for an implementor-defined category in the status codes.

• Conformance — Provision was made for implementor definition of the relationships between Cobol names and external operating system names.

• Declaratives — Segmentation is now permitted in the declarative portion of the programs; however, at the same time recursivity is specifically forbidden.

• Punctuation — The delimiter for pseudo-text was changed from the double-slash (//) to a double-equal-sign (==).

Kearney said many comments had fallen into "how does it work" and "why" categories. All these cases, he reported, were able to be handled satisfactorily.

Opposition to some aspects of the specifications — the inclusion or exclusion of a given feature, the deletion of some existing standard feature or the decision as to which module a given feature was placed — was considered substantive.

In the case of additions to the language, however, the committee was unable to act upon these comments, and proposed to have them forwarded to the CodasyI Programming Languages Committee (PLC) for consideration.

The committee rejected suggestions that the conformance section (the section that defines what is, and what is not entitled to be called an Ansi Cobol compiler) was too permissive, and also one suggestion that said it was too strong.

The draft standard permits any compiler, which includes some complete modules of the standard Cobol, to be labeled as Ansi standard, even though it may use non-standard "extensions."

The committee also rejected comments opposing the current restriction that a

report produced by the Cobol Report Writer could only be directed to a single file, objecting to the elimination of the NOTE, TALLY and EXAMINE items, and their cutback in the suggested label-processing concept.

The new label processing available in the suggested Cobol draft provides only minimal capabilities and drops the use of the USE... label statement and the LABEL RECORDS IS... clause, both of which are included in the current standard.

Action is continuing on other comments that have been received since the X3 meeting, including a suggestion that a Collating Sequence be defined as a part of the new standard. This is being referred to the PLC for action, Kearney reported.

X3J4 action on the draft, including all comments, is scheduled to be completed by the May X3J4 meeting, at which time an updated status report will be used as a basis for an X3 letter ballot.

Police Network Goes to the Country

ELIZABETH CITY, N.C. — A computerized police information network has given police in this state's rural, isolated communities the ability to check license plates and licenses, identify wanted persons, trace stolen weapons or property, help catch car thieves and consult other police departments across the country, all in a matter of minutes.

"There's no question of the value of the computer in helping us enforce the law, acting as a deterrent to crime and aiding communications," observed Robert Morgan, the state's attorney general.

Established in July 1969, the North Carolina Police Information Network (PIN) is built around the Univac Law Enforcement Application Package (Leap).

PIN is tied into several other information systems, such as the Department of Motor Vehicles, providing a quick check of all registered vehicles, registered drivers and previous driving

offenders.

The North Carolina Highway Patrol's communications center is linked directly to PIN and makes the link between the system and the FBI's National Crime Information Center.

The system is currently making 30 to 40 successful matchups per day. One of the biggest hits occurred when Winston-Salem police used PIN to check the serial numbers of vehicles in a local used car lot. The National Crime Information Center flashed back that 47 of the cars had been stolen in the Chicago area.

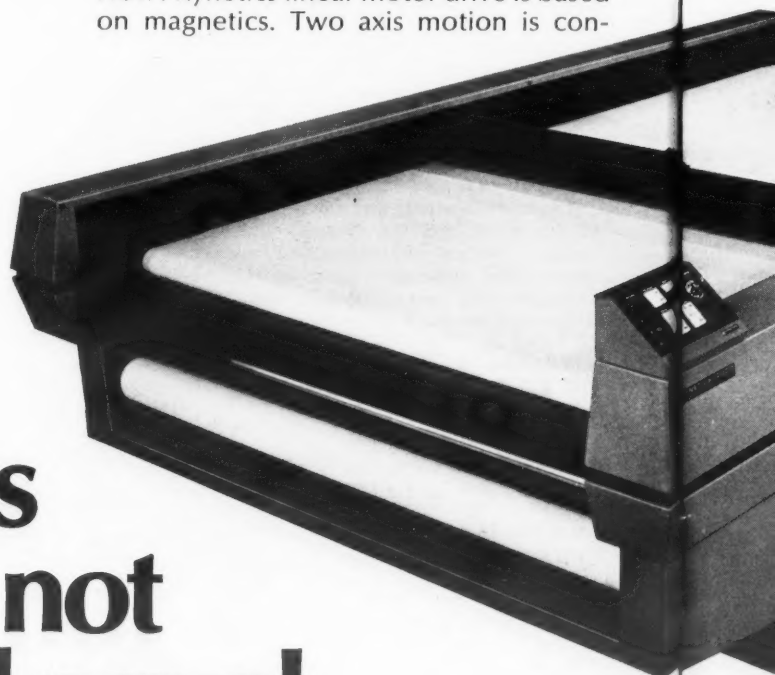
"We plan to enlarge PIN into a comprehensive criminal justice information and statistical system," said Howard M. Livingston, director of the system. "Each component of the criminal justice community, including law enforcement, courts and corrections, probation and parole, will be interfaced in an integrated system providing complete information on offenders."

It took the other
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Considering the limitations imposed, the builders of drafting systems based on mechanical drives have done an outstanding job. But as always happens, something far better came along to take the place of the old ways and render them obsolete. Xynetics linear motor drive did just that. How? Xynetics linear motor drive is based on magnetics. Two axis motion is con-



All plotters
are not
created equal...

Bill Would Restrict Medical Data Exchange

Special to Computerworld

SACRAMENTO — The issue of privacy and the computer has been reintroduced into the California Legislature and this time the target is medical records.

Sen. Peter H. Behr has introduced a bill in the Senate to stop insurance companies from circulating confidential medical records in the open market "for sale, barter and exchange."

Behr claims numerous California insurance companies, after acquiring medical histories, feed this information into a central computer where it is available to other insurance companies.

The bill would require insurance customers to be told who would see their medical records and for what reason.

Software Lives... at DPMA

PARK RIDGE, Ill. — "Live software demonstrations" at the exhibit hall during the Data Processing Management Association's '73 international conference and exposition will offer attendees a chance to learn more about prospective software purchases.

The DPMA show will be held at the Conrad Hilton Hotel, in Chicago June 26-29.

DPMA is at 505 Busse Hwy., Park Ridge, Ill. 60068.



University to Model Child's Learning Ability

PITTSBURGH — Carnegie-Mellon University has received a \$130,500 grant from the Spencer Foundation to make computer studies of how a child's learning capacity develops.

Dr. David Klahr, associate professor of industrial administration and psychology, will direct the research which involves building computer models of a child at various levels of development.

Basically, this is done by building a computer program which includes all stored information and processing routines a child needs to perform a specific task, Klahr explained.

"Once precise models of different performance levels have been constructed, we can begin to examine the difference between them," he said. By doing this, the researchers hope to determine what is needed to stimulate a child to move from one developmental stage to the next.

Included in the work will be experiments with adults and children.

Stolen From Police Department

Cops Reach for DP After Heroin Heist

By E. Drake Lundell Jr.

Of the CW Staff

NEW YORK — A computer has been called into service here to help a special squad of detectives solve one of this city's most bizarre and embarrassing robberies.

The robbery involves over 390 pounds of heroin and cocaine that were stolen from the police department itself. The department was keeping the drugs as evidence against alleged drug dealers or users.

Since it appears likely the theft was an "inside job," the case has proven doubly embarrassing to police Commissioner Patrick Murphy who has described it as the "worst instance of police corruption" he had ever seen.

Closing In on Suspects

The computer has been used, Murphy revealed, over the past month and a half to analyze the records of over 1,000

policemen in order to narrow down the possible list of suspects.

The information fed into the computer about the policemen who were assigned to certain suspect units includes when they entered the department, where they worked during their police careers, their associates, the cars they drove, the license plates assigned to these cars and other data.

The police hope that by using the system they can narrow down the number of police who would have had access to the drugs over the entire period.

According to Murphy, this was the first case he knew of where a computer had been used for the specific investigation of a particular case, even though the systems are widely used to retrieve such information as license plates of stolen cars or serial numbers of stolen guns.

However, he indicated, the police here

have never used a computer for cross-checking on suspects in a particular case as widely as they are doing in this one.

In-House Fear

Apparently the case has made the police department wary of its own computer complex — possibly out of fear that the individuals who stole the drugs would have associates working in the DP center, sources said.

Thus the police department here is not using its own in-house computer systems for this case, but is using a system at Grumman Data Systems.

"The police department in this town has a lot of computer power which they could have used for the investigation," one source said. "Their choice of using an outside vendor for this investigation makes you wonder how deep they think the corruption in the department goes," he added.

Sources said the use of the computer had enabled the department to narrow the list of suspects to only a small number of policemen.

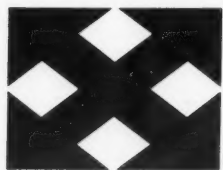
trolled by the interaction of magnetic forces between the linear motor and the table platen. The linear motor which carries the drafting head is separated from the platen by an air-cushion to eliminate friction completely. The result? A highly reliable high speed magnetic system with no moving parts making metal-to-metal contact. Compare this to gear train, cable system or lead screw designs. Lots of moving parts. All subject to wear, out of tolerance performance, and mechanical failure leading to costly maintenance and downtime.

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Medical Information Library Expanded To Access 140 Sites

By Peggy Zientara

Of the CW Staff

ALBANY, N.Y. — The State University of New York and the National Library of Medicine have joined electronically under terms of a \$240,000 contract to double the capacity of Medline, a nationwide computer medical information system for researchers.

University Chancellor Ernest Boyer explained the new system gives doctors and researchers access to 1.7 million articles published in 2,300 medical journals during the last decade.

5-Second Reply

At peak periods the expanded system can respond in five seconds to 90 simultaneous requests from users for information stored in 140 medical libraries, including four in France and Canada.

The university's computer center will provide its Medline users with about 93,600 "connect hours" Monday through Friday on a yearly basis. The biomedical network will continue to provide its users with 49,140 "connect hours" a year. Last year contract users completed over 21,000 searches.

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RCA

Purchase/Lease/Rent? Don't Forget Residual Value

By Dick H. Brandon

Special to Computerworld

The purchase/lease/rental decision on computer equipment is receiving more and more attention, and deservedly so, since better than half of all users to date have made the *wrong* decision.

An unknown factor in this analysis for making this decision is the residual value of a computer — that is, what will be the open market value of a computer system in future years?

Although this question might be regarded as a prime candidate for the crystal ball, it can in fact be answered realistically. For one, there is a market for used equipment today, and even a "blue book," which gives indications of current pricing, which in turn can be applied to potential future value. In addition, vendor marketing strategy can be assessed, and from it an indication can be

obtained of industry direction.

Obsolescence comprises three factors:

- Physical obsolescence — wearing out — on which little data is available. In any event, it does not appear as if computers wear out in less than 15 to 20 years.

- Technical obsolescence — the appearance of a replacement so superior that it invalidates continued use of an existing model. Since the manufacturers design their computers for an eight to 12-year life, this too is not a major factor in new equipment.

- Economic obsolescence — when the user can no longer use the equipment economically.

It is the last case which creates the shortest life, and in turn creates a used equipment market. The adjoining table is one example of a residual value table, for an IBM 370/158 purchased today.

It assumes an investment tax credit availability (which immediately drops the price by 14% on day one since a second purchaser would not obtain it), a warranty (which drops the price by 1-1/2% after year one) and a mix of peripherals as indicated.

The greatest drop in value, perhaps like an automobile, is on the first day of use. At that point, a second purchaser would feel that he might not be able to call on the necessary IBM support, as a second user. This is, of course, not true, but since the salesman on the second purchaser's account has not received the bulk of commission, his interest might be less.

Furthermore, as already mentioned, the investment tax credit of 7% has been forfeited; this represents a pretax 14% value for those organizations in the 50% average tax bracket.

In subsequent years, depreciation flows

Residual Value as a Percent of Purchase Price

At End of Year	370/158 CPU	3330 Disk 3420 Tape	2314/19 Disk Other Tapes	Card Readers/Punches Printers
1	78	80	70	70
2	70	70	60	60
3	65	60	55	50
4	55	50	45	40
5	40	35	30	25
6	35	25	20	15
7	30	15	10	10
8	20	10	5	5
9	10	5	0	0
10	10	0	0	0

Factors taken into account in the structure of this table include popularity of the system; tax credit; date of original announcement; possible physical obsolescence; anticipation of new announcements; warranty on mainframe; age of the system; expected marketability; and availability of vendor maintenance.

reasonably even, until a major announcement by IBM. Thus, the table expects a 1977 announcement which will strip 25% of the value of the system in two years. However, it is expected that a 370/158 mainframe will be marketable for more than 10 years at 10% or so, if only for use as a 380 front-end processor.

This is not the case with the peripherals, whose physical wear factors would increase maintenance costs beyond a point of economic return after 10 years.

Brandon is president of Brandon Applied Systems, Inc.

Here's a Magazine Tailored to Individual

PHILADELPHIA — Is the computer depersonalizing the entire population, reducing each of us to slots in a punch card? Not at all, according to Lane Palmer, editor of *Farm Journal*.

In fact, a computer makes it possible for his magazine to be published in as many as 200 versions with different editorial and advertising content under the same cover, tailored to a reader's particular needs.

"To make sure that you get the right edition, at the right address for the right number of months, we ask each subscriber for as many as a dozen different pieces of information, keeping track of them all with a computer," Palmer said.

The 1973 Computer Caravan is coming

SAN FRANCISCO

April 3-5 — Civic Auditorium

KANSAS CITY, Mo.

April 11-13 — Municipal Auditorium

CHICAGO

April 17-19 — Conrad Hilton Hotel

CLEVELAND

April 24-26 — Convention Center

Forum Workshops*

Day 1:

9:00 a.m. Data Entry
2:30 p.m. . . . Data Communication Planning

Day 2:

9:00 a.m. Data Communications
2:30 p.m. Software Evaluation Panel

Day 3:

9:00 a.m. Installation Management
2:30 p.m. Small Systems Panel

*Entry to the morning sessions is \$25 per day, which includes all workshop materials, luncheon, and admission to the Exposition Hall (see pre-registration form on page 12). Afternoon sessions are open to all — free of charge.

Exposition Hall

10 a.m. to 6 p.m. daily. Tickets are \$5 per person and should be purchased at the door.

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cpm. Line printers, 200 or 400 lpm. But with all models, you get the famous INCOTERM SPD 10/20 Display Terminal. The terminal that put the word "Intelligent" into the display business. It has magnetic core memory. It has communication rates from 1200 to 4800 baud.

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Foundation Societies Urged to Pay DPMA \$2,500 Each for CDP Exam

Special to Computerworld

SAN DIEGO — Lynn M. Maier, president of Automation 1 Association, has suggested that each of the 10 non-DPMA societies in the Computer Foundation pay \$2,500 to DPMA for the rights to the CDP exam. This figure could be increased later if it is determined the exam is worth more.

In an open letter to the other members of the Foundation Organizing Committee Maier said, "We suggest that it might be a mistake for the Computer Foundation to accept the CDP as a gift [from DPMA]. Because gifts frequently have strings attached... and although the strings may be only implied... they are strong nevertheless."

In the same letter, AIA also expressed concern over recent developments within the foundation and suggested it may have to withdraw from the project.

The financial impact of the sale of the examination could apparently help DPMA. During the 1969-1972 period the losses from administering the examination amounted to \$40,000, and appears to have been a factor in the serious losses suffered by the association during the same time period.

In the past, DPMA had hoped to make testing programs substantial contributors

to association funds, but when the Registered Business Programmer exam fell \$150,000 short of budget in 1971 these hopes appeared to have been abandoned.

In the meantime, the debate continued over the position of Quality Data Processing, one of the seated members of the committee, when committee chairman John Swearingen insisted that QDP "had not been accepted as a member," although the minutes show it had been.

Sources on the committee suggested Swearingen's refusal to accept QDP could be based upon a misunderstanding of QDP's nature.

It was thought that Swearingen believed QDP was not an actual group, and so could not be eligible for membership on the committee. It was found, however, that QDP has a 10-year history, and has many unusual characteristics — no officers, no membership dues and yet an active program of contributing to professional life.

So You Want to Be a Technical Writer?

BOSTON — If you want to write for a technical publication, but don't really know the ins and outs of getting into print, two one-day seminars, sponsored by Boston University Science Communication Division of the Graduate School of Journalism May 25 and Oct. 19, may be of help.

Editors of 14 national technical publications headquartered here will explain what they're looking for and how to get stories into the news and feature sections of their publications.

Participants will have lunch with one editor and dinner with another.

Among the topics to be discussed are:

- How to determine which publications are more likely to be interested in what kinds of articles.
- How to deal with the editors of these publications.
- What kind of help and guidance is to be expected from them.
- How to start a book with a series of published articles.

- How to become a newsmaker.
- How to become an occasional staff columnist or guest editorialist.
- How to get different versions of an article in two or more publications as "in-field exclusives."

Publications participating in this seminar include *Circuits Manufacturing*, *Computer Design*, *Computerworld*, *Data and Communications Design*, *Design News*, *Digital Design*, *Electrical Design News*, *Electromechanical Design*, *Laser Focus*, *Microwave Journal*, *Modern Data*, *Modern Materials Handling*, *Plastics World* and *Telecommunications*.

The seminar, "How to Write for Publication," will be held at Boston University's George Sherman Union. The registration fee of \$75 includes lunch, dinner and cocktails.

Checks should be made payable to Boston University — SPC and sent to Shirley Coyne, Boston University School of Public Communication, 640 Commonwealth Ave., 02215.

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is all we need
to prove
our multiplexers
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- ☐ Have your sales/application engineers contact me to discuss the system
- ☐ Send more information on your equipment and the Not-So-Free Trial.

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Company _____

Address _____

City _____ State _____ Zip _____

Atomic Bomb

"The location is safe from all but a direct hit by an atomic bomb," pointed out H. Van Wyck Darrow, executive vice-president of Savings and Loan Association of Kingston and treasurer of Thrift Data. "A consideration of this kind of security is important because of the vital nature of the records.

"Since not as many people can get access to the building, the crime element isn't here as it would be outside," noted Sudlow. "It would be harder to get into the underground facilities than it would be to get inside the White House."

Thrift Data began to service the members of the consortium Jan. 1 of this year and expects to have all 12 members on-line by May 1. Since the service bureau has about a 66% excess capacity, the consortium will offer Thrift Data services to other area banks, featuring security as one of its selling points.

The system, which had start-up costs of around \$600,000, consists of two NCR 315 computers.

Heavy Security Keeps Underground Firm Safe From 'All but A-Bomb'

By Ken Shonk
Of the CW Staff

ROSENDALE, N.Y. — A service bureau here owned by and operated for a consortium of two savings and loan associations and 10 savings banks in the central Hudson Valley area of New York, has located its computers in a cave.

Security was the primary reason Thrift Data, Inc. went underground. "We located underground for the same security reasons that banks store microfilm records in underground vaults," said George Sudlow, president of the data service. "The location gives computers the same security from catastrophic events."

For anyone to gain access to the 30-acre cave, a participating company must notify New York Underground, operators of the cave facilities, by writing ahead of time. When the visitor arrives, the company is then checked to confirm the visit.

The cave, with a 10-ton lead-lined steel door, provides a constant temperature, and has a backup electrical generator for all facilities.

Editorials

Ending a Problem?

Computerworld rarely has guest editorials, and rarely takes apparently frivolous approaches to issues. We did both recently — in an editorial prompted by a complaint from Robert M. D'Unger that his name was frequently being misspelled by computers. We did it deliberately because we felt that the mere publication of his complaint simply would not attract the attention the problem deserved.

In this we appear to have been correct. We have received many comments about the editorial, but only one other suggestion for D'Unger. This was to write to the president of the offending company.

The time has passed when writing such letters should be considered as a necessary chore to be undertaken by the public. If there is in fact confusion in handling names, then it is up to the data processing profession to handle them properly, if technically possible.

Our editorial was designed to determine whether there was confusion — and whether there was any particular reason for the lack of a practical solution. We could see no technical reason for the confusion, but we could not be certain!

The letters we received certainly indicated confusion. The position for "D'Unger" was stated to be between DUM and DUO, after Czardas and before Damon, after the DZ's, before the DAs, etc.

Regrettably, only one person — writing from England — apparently had realized the clue deliberately included in the editorial regarding the data capture situation.

H.R. Sides correctly noted the names "Dunger" and "D Unger" would appear in our character strings, as well as "D'Unger." He noted that we would have to deal with the whole situation as well as with the single case of actually receiving the D'Unger string. Our congratulations to him!

We would add also that DP professionals may not be assertive enough in demanding general solutions to general problems such as this — they sometimes accept patchwork solutions that buy convenience for in-house use, but only at the cost of ignoring the real need.

What is needed is a set of standards that puts the public interest first.

Now is the time for action to end D'Unger's problem. He has lived with it quite long enough.

IBM and Its Employees

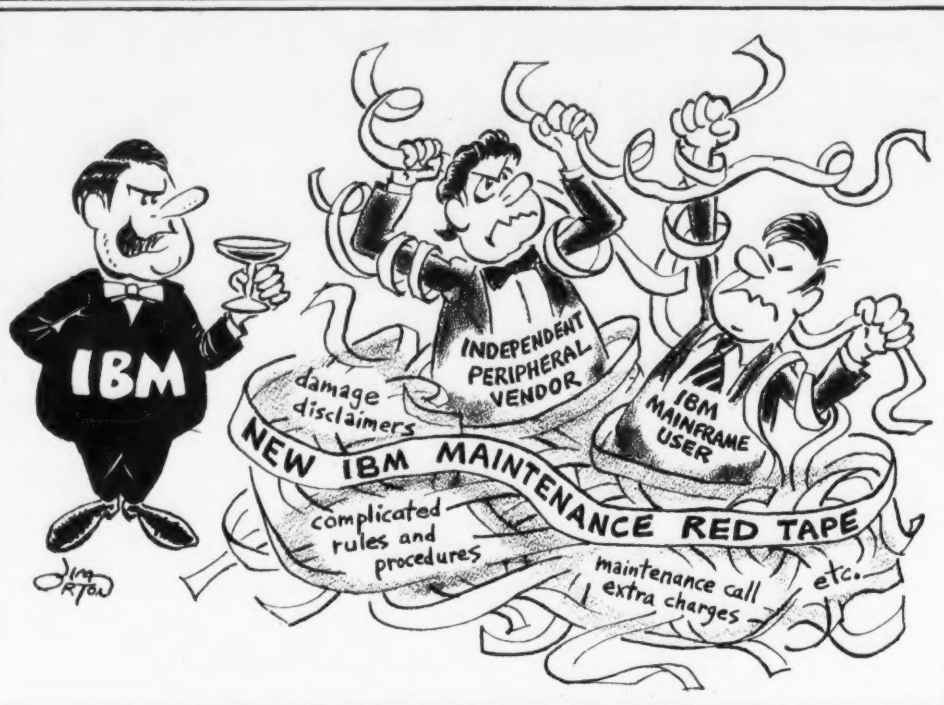
Recently several employees of the Service Bureau Corp. filed a class action suit against their former employer, IBM, because of their "involuntary transfer" from an employment that they respected and had anticipated to continue indefinitely.

Whether they were legally or morally justified in bringing the suit we do not know — but we cannot help but think that another group of IBM employees might well consider such action in the face of the attacks their employer has made upon their professional skills.

We refer, of course, to the field engineers. The recent action by IBM in equating "practical" maintenance with maintenance exactly as laid down in the IBM procedures is an insult to the professional skills of these employees, suggesting that they are no better than robots, unable to deviate even the slightest from the path conceived for them by their employer.

Some engineers may be so dead — and some may give the appearance of being so when observed. In general, however, the ones we have known have been live human beings who find it practical to use some initiative, and to learn new skills.

Apologies are due them from their employer.



'Here's to a Binding Agreement, Gentlemen'

Letters to the Editor

...On Robert M. D'Unger's Problem

(The following letters are comments on a March 21 editorial in *Computerworld* on the inability of a computer to spell Robert M. D'Unger's name correctly. A second editorial on this issue appears on this page.)

Gigo Returns!

Poor Robert D'Unger has a real problem. Telling him to "live with it" is not constructive and, I hope, not what most D'Pers would consider a proper professional comment.

The system design problem should be quite simple: Consider the name field to be alphameric rather than purely alphabetic. This will also take care of people with names like Smythe-Jones.

In an EDP environment, "D'Unger" should now come before DA or after DZ, depending on whether special characters are low or high in the collating sequence. Things are not quite so nice in an environment using card sorters.

On an IBM 082, D' still comes before DA, but D- comes between DI and DJ. Even so, any name should still be spelled correctly — yes, length is a serious problem in a fixed-field environment.

I suspect the real problem is not with the computer or program, but rather in the area of data capture or preparation. Insufficient instructions to or training of personnel in this area would explain the dropping of the apostrophe and the resulting "DUNGER" or "D UNGER."

Also, certain equipment might conceivably have character limitations which cause the apostrophe to be lost.

Thus it seems to me the main part of the problem is not poor system design — nor is it an individual's failure to be given a name which is "sensible" to our friend the computer — instead, it is our old enemy Gigo.

H.R. Sides

Heywood Lancashire, England

...Lazy Programmers

... There is no reason, Robert D'Unger, why your name should

be spelled by a computer any differently than the way you want it. The reason it is always misspelled is that our programmers are too lazy, or too pressed for time, to write decent programs for keeping machine-readable records.

William Lee Valentine
New Orleans, La.

A Workable Sort

... A standard sort on our computer would place him ahead of other "D" names — not according to Bell System rules, but in-house as workable a scheme as any for readability and communication.

A suggestion for people-oriented firms is to use character sets and printer graphics that contain apostrophes.

Douglas D. Cuthbert
Rock Island, Ill.

Using a Tag Sort

... When we want a list in alphabetical order, we do a tag sort. Before the name is entered in the sort, it is stripped of such things as apostrophes. The source for the sorted printing is the correct name from the disk. In this way D'Unger would print between DUM and DUO where someone would expect to find it on an alphabetic list.

R. Peter Ericson
Hartford, Conn.

Write to President

... I would suggest two approaches. First a letter to the president of offending companies to the effect that he employs very expensive people to offend the really important people — you the customer.

Second, play their game, write to them about your account, without the apostrophe as Robert D. Unger and as Robert M. Dunger. If that doesn't drive them to correcting the situation, then they probably do it by hand anyway.

Jim Fetergale

Richmond, Ind.

Change the Computer

... You are telling a man that

because his name is different he doesn't belong in this country and, therefore, he should change his name if he wants to stay here. I say let's change the computer to recognize the people and not require changes in names that may be centuries old and recognized, in some cases, on a worldwide basis just by humans but not necessarily by the monster machines put out by U.S. industry.

Henry L. Valo
Minneapolis, Minn.

Or Printer Chain

... I know of no technical reasons for denying D'Unger the proper spelling of his name in computer-produced documents, unless there is no apostrophe on the printer chain.

John B. Beall
Fraser, Mich.

Programmers Again

... A little less laziness on the part of programmers, systems analysts and data preparation people, and there would be no apostrophe problem.

T.E. O'Connor
Mountain View, Calif.

Placing the Apostrophe

... I only know IBM sorts, but if the apostrophe were put in D'Unger's name in the proper place and the sort was done on the last name field defined as CH or BI ascending, rather than customer number or some other control field as is usually done, his name would appear in the right place in the sorted list.

It would come after Cyrus and Czardas and before Damon and DaVinci. What about two capitals in a name. The collating sequence of an apostrophe, a 5-8 punch in an IBM card, if the sort was done ascending, is before both alphabetic and numeric characters.

Stuart O.F. Brand
Syracuse, N.Y.

(Other letters and viewpoints on Pages 11, 13 and 14.)

Documentation Standard Needed

Grass Roots Take Next Step on Professional Road

The road to professionalism is really not a very long one, at least not in terms of the number of steps involved. The first step is always to find a body of professionals. The second step is to find functions for them to perform which when performed benefit both public and professional alike.

The third step is to describe the functions well enough so they can be performed economically. The fourth step is to implement these functions.

A month ago the DP profession had only taken the first step. Even that was not clearly taken. We did have a number of people picked out, by one means or another, who could be called "professionals."

We had the memberships of our professional societies, the computer science graduates, the holders of the CDP and the people who were successfully practicing. All these groups could be seen, in one way or another, as "professional persons."

During the last month, however, leaders of both CDP holders and DP practitioners have suggested a second step. They have, in fact, suggested the function which is needed to bring professionalism to us.

Documentation Standard Needed

Ron Stewart of the Society of Professional Data Processors (SPDP) made the first suggestion. He was commenting on a paper on enforceable standards written by SPDP President Hamilton Armstrong. Armstrong had suggested that part of any data processing standards enforcement procedure would have to be the provision of a list of the application documentation, together with the location of each study listing.

Armstrong pointed out that anything that had a responsibility for quality also had a responsibility for the quality to be monitored economically.

Stewart went further. He saw such a list not just as part of an enforcement procedure, but as a necessary part of any data processing application. In reviewing Armstrong's ideas he said, "Perhaps this documentation list should be the first real data processing standard that the profession should enforce."

He has a point there. It is hard to see how any data processing operation — such as school reports, payrolls, inventory control — can be really controlled by its management, let alone inspected by auditors, unless there is a list of all the essential documentation involved, and details of where it is currently kept. The requirement for such a list would make an excellent standard.

At the same time, the new president of the Society of Certified Data Processors, Jerry Martin, came up with an idea for two types of certificates which he feels can greatly improve data processing professionalism.

Interestingly enough, in view of the fact that his organization is made up of certified people, neither of Martin's recommended certificates is a certificate of people. One is a certificate of documents, and the other a certificate of application testing.

Martin's documentation certificate would say that someone had looked at the document, and had also looked at such working papers available to support the statements in the document. It would simply record someone's opinion as to whether these working papers support all the figures in the document, and whether the document itself is a "fair" presentation.

Martin's suggested documentation certificate is very different from Stewart's suggested documentation standard. Martin's certificate is more like the certificate given by an auditor, and in fact appears to be modeled upon the CPA certificate.

Like the auditor's certificate, Martin's idea is not to have the inspector replace the document's author. The inspector merely looks at the figures, looks at the data in the working papers, and says whether or not one supports the other. The outside public — or management — should then value the word of both men more.

Testing Certificate

Martin's second idea argues for a certificate of testing for an application. This states that the application has been tested in an appropriate manner while it is running. Martin compares this to the testing given to most elevators every year. In elevator-testing the elevator is run with a known load, and the speed and acceleration factors are noted.

Similarly, Martin is arguing that a data processing application could be regularly tested by means of simple tests to see how long it takes money to be posted, how easy it is to obtain a correction, etc. He does not go into details as to what the tests should be, but merely argues that certification that the application has been tested would itself be of great value.

Standard Could Be Test

Martin's and Stewart's proposals do, in fact, fit together. For instance, Stewart's documentation standard could well be one of the items to be checked before Martin's documentation certificate could be given.

I think it would be quite reasonable for an examiner to test an application by looking to see if adequate documentation is listed and is in its proper place. This would, after all, test whether the application is capable of responding quickly to emergencies that have not yet occurred — a very necessary test.

But I can see even more possibilities in Martin's certificate. For instance, I see a test of credit card operations which would check on the length of time it takes to post money to someone's account. This is something which should never be delayed so much as to cause an improper finance charge.

It is the function of the total data processing system to get the money posted in time, once the customer has delivered it in time. Testing that this is occurring should be fairly simple.

The documentation certificates could also be given on such items as recommendations for the procurement of data processing equipment, or for the budgeting of sums of money for such equipment. Here the certificate would show that the analyses claimed to have been

Questionnaire on DP Certification

1. Do you agree that any data processing application should have an essential documentation list, noting the documents involved and saying where they are?

☐ Totally Agree ☐ Partially agree ☐ Do not agree at all

Please give reasons _____

2. Do you agree that data processing reports and recommendations should be properly supported by the contents of the working papers that detail the work undertaken in the preparation of the reports, and should fairly represent the data in the working papers?

☐ Totally agree ☐ Partially agree ☐ Do not agree at all

Please give reasons _____

3. In what cases do you think documentation and testing certificates should be compulsory or optional?

(a) Compulsory _____

(b) Optional _____

4. Do you agree that operational data processing applications should be regularly tested?

☐ Totally agree ☐ Partially agree ☐ Do not agree at all

Please give reasons _____

If you agree, under what circumstances do you feel operations should be tested, with what type of tests and how often?

Other Comments _____

Name _____

Address _____

Society Memberships _____

Professional Position _____

After completion, please return to the SCDP/SPDP, c/o The Taylor Reports, Computerworld, 797 Washington St., Newton, Mass. 02160.

carried out in the final report, had in fact been carried out and were included in the application documentation.

As I said in the beginning, the first step towards professionalism is picking out the right people. This has been done.

The second step is to provide a general mechanism which can improve the quality of data processing. Between them, Stewart and Martin appear to have made this step, with their mechanism consisting of two certificates, and an undefined number of potential tests within the certificates. This is a step that only needs the involvement of a few people.

The third step, and the last one before the actual implementation can start is for someone to describe what should be handled in the certificate operations. This involves the profession as a whole. You must say when the certificates are needed, who should give them, who

should pay for them and how much, how the area should be controlled, etc. The grass roots should decide what standard of support is needed in the working papers, what testing is needed, etc.

This is your opportunity to take a stand and make your contribution. If you speak up now, the profession will be well on the way to having taken the third of four steps toward data processing professionalism.

Please write or use the above questionnaire. I know it will be of great assistance to the profession. (If you want free copies of either Stewart's or Martin's ideas in detail, send a stamped, self-addressed envelope to me.)

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Letters to the Editor

Major Revisions Needed To Improve CDP Exam

I was among those who took the CDP exam this year. Because Alan Taylor, through *Computerworld*, so strongly advocated professionalism in data processing and the value of the CDP as a means to that end, I felt it desirable to register my disappointment with the exam.

Of all the exams I have ever taken, this was perhaps the most poorly constructed. Specifically:

- How can we test the competence of a "DP professional" with 300 vaguely worded multiple-choice questions?

- How can we justify questions which in reality ask for opinions, but offer no chance to defend one's opinions?

- How can we call someone a "professional" when no effort has been made to test his ability to express himself in clear, concise English?

- Is Cobol the only language that professionalism can be based upon? In fact, can knowledge of programming be shown at all if no programs are required?

- Aren't there techniques (flowcharting, for example) which are important enough to programming, systems analysis and management that they should be tested in a problem format?

- Aren't some very important areas being skipped (e.g., security and business law)?

In short, what I am saying is this: If the CDP is ever going to be data processing's

equivalent to the CPA or bar exams (as many of us would like it to be), it must be revised to include essay questions, problems and programs (none of which lend themselves to machine grading); it must be more difficult and more comprehensive; and it must include options (after all, our field is vast, and all of us have areas of strength and weakness).

It is the writer's hope that the new Computer Foundation being formed by DPMA, ACM, et al., recognizes the problems I have described. Employers, the public and data processing professionals alike will benefit from a sound certification program.

Joseph A. Leubitz
CPA

Skokie, Ill.

Here's just some of what's happening at the 1973 Computer Users' Forums.

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Day 3—Installation Management—Including Personnel recruitment and training, Programming management and independent peripherals (including memories).

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Day 2—Software Evaluation Panel
Day 3—Small Systems Panel

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Next stop: Kansas City. And here are some of the panelists who will be there: Dick Baker, Chema-gro; Dave Setty, Cessna; Jim Rooney, Massey Ferguson; Lee Stevenson, First National Bank of Kansas City; Carl Barron, Smak's Inc.

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The Professional's Viewpoint

Progressive Certification Plan Would Identify Skills

By Mike Gates

Special to Computerworld

Joseph Rigo's letter [CW, Jan. 24] was very interesting. The arguments he presents against a data processing certification program are certainly novel.

His first argument, that DP persons deal only with knowledgeable managers and do not come in direct contact with the public is, to say the least, naive. Granted, DP personnel do not generally deal directly with the public. But one of the most vexing problems facing DP managers today is the lack of standards for identifying various levels of skills in prospective employees. (who are members of the public?)

How many DP managers can be sure, even after the most exhaustive of interviews, of the depth of knowledge of the prospective job applicant? Any of us who have served in that capacity have had the experience of hiring an applicant we felt

probably quit the first time you asked him to work through his lunch hour.

I really believe Rigo has missed the point. No responsible person claims that a data processing certification program will be a substitute for competence. No responsible person can say that the possession of a certificate will grant magic powers to the bearer.

And certainly no responsible person would contend that possession of a certificate should be a substitute for the manager's judgment in selecting job applicants.

What a certification program will accomplish is to uniformly identify a group of individuals possessing certain levels of skills in the data processing field. It will assist the industry in standardizing job definitions and job descriptions in a manner that should lighten the burden of management in identifying competent people. That is a worthwhile goal, I be-

lieve, and its achievement is the real point that should be addressed.

I am not claiming that the CDP or the RBP is the final answer in the area of certification. I do feel the current approach leaves a great deal to be desired. To begin with, the CDP is too general and too easy. It seems to me that a set of progressive examinations given over a period of years culminating in a CDP would more closely identify truly dedicated and competent people.

There should be separate certification paths for programmers and analysts. These should be progressively more difficult and should eliminate the less dedicated and skillful. The joint ACM/DPMA council would do well to study the certification program leading to the Fellowship in the Society of Actuaries. A program like this would truly identify exacting knowledge levels.

But this kind of program will work only

if the industry adopts a strong posture towards it. Management must get behind a program of this kind. Raises and promotions would have to be based on successful completion of another level of success in the program. Companies would have to get behind such a program, and the plethora of DP societies would have to end their intramural squabbling and get behind the effort 100%.

We in the profession of data processing now are extremely fortunate. We can mold the shape of the profession for many years to come. Or we can sit back and let it run loose as we have in the past. I think we have a rare opportunity to accomplish something most people never experience — the forming of a new profession.

Mike Gates is a senior systems analyst in the Insurance Application Group of American National Insurance Company, Galveston, Texas.

"... one of the most vexing problems facing DP managers today is the lack of standards for identifying various levels of skills in prospective employees."

confident about, only to discover quickly that the applicant (now the employee) has only a superficial understanding of the areas he had discussed in the pre-employment interview. The possession of a certificate would surely give employers some protection.

The argument that employers might drive off the top-notch applicant by placing importance in certification leaves me puzzled. Many professions use certification programs to identify varying skill levels without a noticeable recalcitrance among the highly qualified practitioners of the trade.

It would seem to me that any applicant who terminates an interview process because of this kind of attitude would

... For Men Only

WASHINGTON, D.C. — A recently released Census Bureau report on "earnings by occupation and education" showed a great discrepancy between earnings of men and women in the computer and other fields.

The report, based on the 1970 census, revealed women computer specialists earned \$8,531 in 1969, while men in the same occupation earned about 25% more, or \$11,422.

In general, women's salaries were about half that of their male counterparts, the report said.

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IBM Fixed-Term Plan A 'New Encroachment'

IBM's new fixed-term plan on CPUs is a new encroachment in a new monopolistic area by IBM. It must be assumed that the reader understands and comprehends the plan.

Primarily it is an attempt to dissuade potential purchase customers from purchasing IBM central processing units. Secondly, it is an attempt to eliminate all OEM and peripheral vendors from encroaching on central processing unit hardware, software and memory components.

Lastly, it is an attempt to eliminate all potential leasing companies and lessors from virtual memory machines, eliminate companies from purchasing machines for their own use, eliminate the add-on memory companies, eliminate the future of the used computer marketplace and gain total control of the hardware for IBM over its customers.

IBM should rent computers to all customers on the basis of current rent minus maintenance. Maintenance should be charged separately for the number of hours used by any customer depending on the usage and not tied to extra-shift rental. IBM should reduce rental on all computer systems for all customers based on the period of retention of such systems.

IBM should allow rental features to be attached and removed from purchased systems as IBM announces new products and peripherals. IBM should charge property taxes, where applicable, on systems to those companies and customers that have property taxes applicable and remove them from current rentals where not applicable.

No one can deny that IBM is the smartest organization in the U.S. The question is how it uses its power. No one could exist if IBM were split into four vertically integrated data processing companies as the U.S. Justice Department suggests.

George S. McLaughlin Jr.
Summit, N.J.

On IBM Bias and Need For a Strong DP Firm

I was indeed delighted to find, in reading the letters to the editor in the last several issues, that there are a number of people who indeed do agree with what I consider tremendously "biased" reporting on IBM and its activi-

ties in the computer industry.

It is my opinion that the need for a strong computer company in the U.S. is becoming more apparent each day, each month with the ever-increasing penetration being made by the low-cost peripherals, and in some cases, CPU manufacturers outside of the U.S.

Again, as stated once before, I enjoy generally what is in the paper, and definitely feel that the good does off-balance some of the biased writings that are published.

James P. Boyle

Vice-President, Marketing
Addressograph Multigraph Corp.
Data Systems Division
Cleveland, Ohio

...And on Being Fair

There is no question about the validity of W.R. McCartin's remarks in his letter [CW, March 7]. However, I have a good guess for the reasons behind the *Computerworld* anti-IBM bias: good business, since the people who buy advertising space represent the real profit for the publishers. And IBM (if it bought space) would be only one buyer — while the others are of course much more numerous.

The key, of course, is in being fair (which I feel would also satisfy all those advertisers) instead of being so anti-IBM (which makes them gleeful).

A case in point is the article on the 370/125 [CW, March 7] which Marshall E. Maynes has decided is a step backward. But the experience of those with big installations belies his view — when were 1401s used to back up 7094s? And how many 7094s were there with no 1401 (practically none)?

When company X makes a product of limited flexibility, it is called progress, and when IBM makes a small product, that is called a step backwards. This is what McCartin meant, and I agree with him.

Eugene Amazon

Geneva, Switzerland

Over the last several years *Computerworld* has been accused of being anti-IBM, anti-NCR, anti-Burroughs, anti-Honeywell, anti-CDC, anti-Univac, anti-RCA, anti-XDS, anti-AT&T, anti-West Coast, anti-Mid-America, anti-Afips, anti-DPMA, anti-ACM, anti-Acpa, anti-Computer Sciences, anti-Storage Technology, anti-Varian, anti-Hewlett Packard, anti-Data General, anti-leasing firms, anti-Nixon Administration, anti-etc. But in spite of all

these allegations we have not been accused of being anti-user, nor anti-truth.

IBM unfortunately does get the lion's share of bad press because it is in the news often and has the lion's share of critics.

But to further clarify our position, we are not "anti-IBM"; we are pro-user. Marshall E. Maynes is not "our reporter." Maynes is a user like yourself and was not paid to write his feature on the 125 that appeared under the "Professional Viewpoint" label. *Computerworld* does not solicit anti-IBM stories.

It is inherent within the definition of "newspaper," however, that *Computerworld* publish articles and letters of opinion from our readers.

This we endeavor to do and we identify opinion by placement either on the editorial page or on one or two pages following the editorial page or by clearly labeling this material "Viewpoint." Ed.

The 360 in 1978

With regard to the article concerning the reappraisal of 360 computer equipment [CW, March 7], our corporation, Data Processing Financial & General Corp., was not one of the companies Peat Marwick & Mitchell audited. I think the confusion is with DPF, Inc. which was formerly known by the name mentioned.

While much smaller than DPF, Inc. we have no reason to think that our assets are going to be at zero in 1978. I am sorry these other companies in the business cannot decide what their assets are worth on their own.

Alvin J. Borenstine
President

Data Processing
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Joseph B. Pomeroy
Director, Computer Center
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Random Notes

Sequential, Isam Files Planned by \$95 Package

WILLINGBORO, N.J. — The Disk Volume Calculator (Volcal), a \$95 package from Apparel Systems Development Co., aids analysts in planning and converting sequential and index sequential files between IBM 3330, 2314 and 2311 disks.

Control card entries define the files, including records required or tracks available. From these, Volcal calculates capacities and track requirements for index, prime and overflow areas, based on the analyst's choice of blocking factors. The package operates in 12K under DOS and requires a 132-position line printer. Apparel Systems is in the Garden Plaza Bldg., 08046.

Independent Produces 'Micos' Operating System for Novas

SCARSDALE, N.Y. — To support development and execution of on-line retrieval applications on Data General Novas, Mini Computer Systems, Inc. has introduced Micos, which includes a multiprogramming operating system, a data management subsystem, a generalized disk sort and an output print spooler.

Micos includes Extensive Basic, an outgrowth of the original Basic, which is said to facilitate data capture from a range of terminals including CRTs, teletypewriters and "intelligent" units. Data management includes reentrant code for file accesses, data sharing and security checking. Micos costs \$8,000, but lease terms are also available from 1075 Central Park Ave., 10583.

'JCL-omatic' Builds Control Streams Triggered by Codes

ST. LOUIS — An OS Job Control Language generator for 360 or 370 users, JCL-omatic, has been introduced by McDonnell Douglas Automation Co.

Functionally, the package retrieves groups of JCL statements from file tables, based on the programmer's entry of a unique code. Each installation determines the contents of its own JCL tables.

JCL-omatic requires 90K, runs under OS and is available for \$5,000 (paid-up license) or \$170/mo (yearly license) from P.O. Box 516, 63166.

'Roscoe' Operates Under VS1

PRINCETON, N.J. — Applied Data Research, Inc. has announced that Roscoe, a conversational remote programming system, is operational on 370/145s under OS/VS1 Release 1. Roscoe, which runs as a standard problem program in a virtual partition of 128K, is monitored by the VS1 paging supervisor.

Roscoe is available for \$18,000 under a permanent license agreement, or for \$1,000/mo. ADR is at the Route 206 Center, 08540.

Study Shows Pros, Cons

How Useful Is Modular Programming?

By Don Leavitt
Of the CW Staff

LONDON — Almost half of all "third-generation" installations are using some form of modular programming, and easier maintenance and amendment, better program design and easier program testing are the major benefits, according to more than 75% of those users.

A study recently completed by John Hoskyns and Co. Ltd., a London-based research organization, confirmed the continuing argument over a detailed definition of what constitutes modular programming, but not over the benefits that can be gained — or the possible costs.

For purposes of the study, which Hoskyns conducted last year in both the U.S. and the UK for the British Civil Service Department, modular programming was defined simply as the organizing of a complete program into a number of small units, where there is a set of rules which controls the characteristics of those units.

There are in fact two methods of constructing modular programs, the report found. They may be either independently compiled subroutines or sectional subroutines, which can be entered only by an instruction (generally a PERFORM or a CALL) contained in the same compilation unit.

Using independently compiled subroutines "can provide considerably more flexibility" in program design and support, Hoskyns noted, but these gains were not without cost. The independent modules can significantly increase the core required for the program, and can extend the execution time, the study showed.

Source Lines Increased

This approach will also increase the number of source lines that have to be written and therefore add to the data preparation resources needed to get the operation up and running, Hoskyns added.

The report noted, however, that with

either approach, users usually found modular programming provided better project control, higher programmer productivity and more reliable programs.

Because the units being developed are smaller, programmers are more likely to meet target dates, and managers appear to agree they have an easier time with resource allocation.

Grumbling in the Ranks?

If the technique is not introduced correctly, however, Hoskyns warned, it can cause widespread dissatisfaction among programmers. The number of comments on this problem exceeded the number of comments on any other subject, the report noted.

Programmers who had previously written monolithic programs complained more coding was required, particularly for linkage data definitions in independently compiled modules, and more test data was needed, even if a test data generator was used.

They tended to dislike the increased amount of documentation required, although this was often an indirect offshoot of modular programming, caused by the simultaneous imposition of programming standards. The lessened opportunity to indulge in the use of "clever" coding techniques was also decried by a number of programmers.

But these problems for programmers are often seen as advantages by managers. In fact, where the technique was introduced carefully, job satisfaction often rose as users avoided crises caused by compounded software errors, and frustrations of waiting for enough computer time to compile and test monolithic programs.

There is evidence to suggest that well-run modular installations are more productive than non-modular installations, the report concluded.

Copies of the 160-page report will be available shortly from Hoskyns Systems Research, Inc., 600 Third Ave., New York, N.Y. 10016.

'Tirs' Reviews Text, Context; Builds Own Retrieval Index

LONDON, Ontario — Users who need to maintain large-scale narrative data bases and to retrieve material from those bases can perform those functions without having to manually encode an accession index, by utilizing the Textual Information Retrieval System (Tirs) from Peter T. Mitches & Associates Ltd.

Tirs and other textual systems are designed to overcome the basic problem of most record-based file systems.

Tirs — and the others — allow the storage of free-form narrative text, and the recapture, on demand, of information from the text.

Until the development of Tirs, however, users have generally had to build their own concordance file as they added to the narrative storage. This, as various antitrust litigants are now discovering, can be a mammoth operation.

Build-In Concordance

Tirs, on the other hand, builds its own concordance as new material is added to its data base, and the user doesn't have to do anything before he uses the data.

The system is said to provide unique identification in human language of each character of text in the data base. Tirs also stores indications of the context of words and phrases from the text.

As currently implemented, Tirs maintains the integrity of the user's original language, including the selective use of capitals and lower case letters, punctuation, paragraph and sentence length.

There is, likewise, no limitation on the type of hardware that can be used to support a Tirs operation.

The complete Tirs software, including on-line support, can be stored in a problem partition of some 76K bytes on an IBM 360; the basic package, including concordance maintenance and batch retrieval, can fit in less than 50K bytes, the company said.

The complete system is available now for \$4,000/mo on a five-year lease plan. The basic, batch-only system can be acquired for about half that price, for the same five year period.

Mitches is at 376 Richmond St., N6A 3C7.

Payroll Geared to Health Care

ARLINGTON, Va. — A payroll/personnel system that can be adapted to meet the differing requirements of several hospitals, clinics and other organizations involved in health care is now available for 360/370-based service bureaus, from OLI, a subsidiary of Datatel, Inc.

The OLI package includes support for special overtime and average differential pay rates, for tax-sheltered annuities and for calculation of on-call hours.

A full range of more conventional payroll/personnel capabilities is also included — such as vacation and sick leave accruals as well as generation of paychecks, check registers and the various

government reporting forms.

The personnel aspects of the system include fields in each employee record for data on education, years of service, anniversary dates and types of insurance coverage. The system produces "reminder lists" for each client, noting which employees should be scheduled for review during the following month.

Written in Cobol and distributed in source code, the system can be installed on an IBM 360 or 370 in as little as 18K bytes exclusive of the supervisor.

The package costs \$5,000 and is shipped from 400 Army Navy Drive, 22202.

For MMS General Ledger Users 1973 Will Be A Happy Year.

Since January, 10 companies have ordered the MMS General Ledger System. Each one of these corporations is worth more than \$20 million (one is in the \$800 million class). They all have the programming staffs and resources necessary to develop their own corporate financial systems. But even the big companies don't have unlimited EDP budgets.

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Data Briefs

Com/Tech System Offers Series of Data Scramblers

NEW YORK — Com/Tech Systems, Inc. has introduced the Secre/Data Series 102 Data Scramblers providing security for data users. Included is a synchronous scrambler requiring no external timing. The 15 models in the series contain automatic cipher synchronization for on-line or off-line operation. Prices range from \$1,100 to \$1,800.

There are over 200 million code settings for scrambling the data. One million codes are selectable by thumbwheel switches and the rest are internal settings.

The synchronous models can operate up to 1M bit/sec with external timing and up to 9,600 bit/sec if no external timing is available. The asynchronous models can operate with standard code formats and speeds, the company said.

Half-duplex, full-duplex and simplex versions are available with EIA or TTY interfaces.

The S102H is a synchronous, half-duplex unit with automatic cipher synchronization and can be used with a Mohawk Data Systems 6403 magnetic tape key station (or equivalent) and a 202C data set. This unit is available at \$1,350 with a 30-day delivery. Com/Tech Systems is at 15 Williams St., 10005.

Uniscope Gets Cassette Unit

SALT LAKE CITY, Utah — Univac has added the 610 tape cassette system to its Uniscope 100 display terminal.

The system can provide up to 1.4M characters for local forms creation in data entry applications. The dual-cassette system includes local forward and back paging of cassette data. An address or content identifier allows the operator to perform on-line searches for specific information.

The system can transfer data with the Uniscope at 4,800 bit/sec and handles Ascii code. The 610 costs \$70/mo to \$85/mo under Univac's one-year rental contract. Purchase starts at \$1,800.

Datran Granted More Permits

DALLAS — Data Transmission Corp. (Datran) has been granted additional construction permits for its data network by the Federal Communications Commission.

The permits encompass 34 microwave radio station sites between Dallas and St. Louis. In April 1971, the FCC granted permits for construction between Palo Alto, Calif., and Houston. A portion of the initial permits covers the segment of Datran's network from Houston to Dallas.

The addition of the 34 new construction permits brings the total to 97 — or nearly half of the 214 sites the company plans to construct between San Francisco and Boston.

Multiplexer as Front End

NCR Terminals Interfaced to 360/30

By Ronald A. Frank
Of the CW Staff

CLIFTON, N.J. — When a network of terminals from one supplier has to be interfaced with a mainframe from another company, problems can occur. But these problems can be avoided when the terminal supplier provides the proper interface unit.

Financial Computer Corp. was serving a network of banks in northern New Jersey with IBM 2980 terminals transmitting data to Financial's IBM 360 Model 30. Financial was providing complete DP capability on-line to the banking customers.

But many of the banks decided to switch to NCR 270 teller terminals which left Financial with a potentially non-compatible device to its IBM mainframe. The solution came from NCR with its 754 multiplexer, according to Nick Libassi, vice-president of programming at Financial.

"The 754 is actually a front-end processor," Libassi explained. "It controls the polling of all the terminals." Financial now has 26 NCR 370 terminals on the network and another 25 are scheduled to be added soon.

In addition to handling the polling operation, the 754 performs vital code conversions that enable the NCR terminals to talk to the IBM CPU. The 754 receives asynchronous Ascii data and converts it into bisynchronous Ebcidic format for entry into the 370/135 which Financial is now using.

Adapting the Adapter

The move to the 135 occurred about the same time as the switch to the NCR terminals, Libassi said. The 135 installation was accomplished with few problems except in the integrated communications adapter.

"Because not too many people had used the integrated adapter, IBM didn't really know what had to be defined in the control unit program," Libassi said. This has since been resolved "and as long as you specify the correct unit out there, it will work," he said.

Financial is planning to expand its net-

work further with the addition of a 370/145 and 2780 terminals. The IBM 2780s will be added for mortgage applications because these types of institutions want to handle much of their own transactions, Libassi said. That is why they need the printer and card reader capability included with the 2780.

The mix of NCR and IBM terminals should pose few problems, Libassi said. Together with the new terminals and mainframe, the company will add CICS along with one of the VS operating systems.

Asked why the banks moved to the NCR 270, Libassi said it was "a better banking terminal than anything IBM had to offer. The 754 multiplexer was purchased for \$30,000 and it allows Finan-

cial's network to achieve a "three to four second response time."

As the system expands, "we will be able to multidrop 754s on our 4,800 bit/sec lines," Libassi said. Data is transmitted to the IBM CPU through ICC 4,800 bit/sec modems.

Right now Libassi is using Btam for network queuing and scheduling. But when the 145 is installed he intends to move to Vtam and possibly also the IBM Network Control Program NCP/VS. An IBM 3705 has been considered but no decision has been made yet, he said.

Among the applications handled by Financial for its customer banks are savings transactions, certificates of deposit, mortgages, passbook loans, Christmas clubs, and check cashing, Libassi said.

Now Is Time for User to Learn How to Pick Interconnection Unit

By Tom Richfield

Special to Computerworld

If all predictions are correct, the interconnection of non-carrier equipment will continue to grow rapidly in the next decade. With the proliferation of new products being offered by various vendors leaping into the market, a valid method of product selection and system design will be required by communications users — not to mention the problem of determining how interconnected equipment will be supported.

With all this innovative hardware, a user must become more aware of his technical foresight, his understanding and finally his education on interconnection products. Preparation for this could mean special training in telecommunications technology.

More Confusion

Some vendors also add to the confusion of users by permitting sales people to begin marketing a sophisticated interconnected system with unsophisticated sales training. This only results in more confusion for more users.

It would seem that the most successful companies entering the interconnect market will have well-trained salesmen. They will also provide service from reasonable distances to the installation site.

Viewpoint: The Right Connection

The user must "brush up" on his knowledge of interconnection hardware, systems analysis, connection and installation before he attempts to make a logical purchase decision.

By choosing the interconnection route he may save money, but he probably will not have the luxury of "on-site" customer service technicians. This will be because of the competitive nature of the interconnection market.

A list of his system requirements, based on an in-house survey might be in order, serving as input to outside consultants.

Their job is to make evaluation and recommendations, but their inside knowledge of his operation will only be as good as he might convey to them.

User Decides

In the final analysis, the user will decide what interconnection system he chooses, if any. The alternatives will be vast, the prices widespread and knowledge of his system requirements will be essential.

If the user has not yet begun his search to understand the various types of interconnection equipment available, now may be the time to learn.

Tom Richfield is executive director of Communications Systems Management Association, 1102 West St., Suite 1003, Wilmington, Del. 19801.

Interim Satellite System Coming?

NEW YORK — RCA Global Communications Inc. and RCA Alaska Communications, Inc., a subsidiary, have filed an application with the Federal Communications Commission for authority to build and operate an interim domestic communications satellite system which could begin providing service as early as Aug. 1, 1973.

The \$7.4 million system would utilize the Telesat Canada satellite in conjunction with five earth stations to carry message traffic between the East and

West Coasts and between both coasts and Alaska.

"The interim system is designed to provide early satellite communications service in the U.S. until the RCA domestic satellite system, which was proposed in 1971, is approved and begins operation," an RCA spokesman said.

The earth stations to be used in the interim system would be incorporated into the domestic system and traffic would be shifted over at no material cost, RCA told the FCC.

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As a joint venture of Computerworld, Inc., and Dempa Publications, Inc., *Shukan Computer* will provide the only newsweekly for the Japanese computer community. Like its sister, *Computerworld*, *Shukan Computer* will cover the latest developments in all aspects of the computer industry; including hardware, software, services, application techniques and industry trends.



Hideo Hirayama, President of Dempa Computerworld Company and Patrick McGovern, President of Computerworld, Inc. look at the first copy of *Shukan Computer*.

Dempa Publications is the leading Japanese electronics publisher.

Dempa publications is currently the leading Japanese publisher of information services on electronics, including *Dempa Shinbun*, the 200,000 circulation daily newspaper of electronics. Dempa maintains twenty-five editorial offices throughout Japan, the U.S. and Europe, which, along with *Computerworld's* editorial staff and correspondents, will provide the largest newsgathering organization of its kind in the world.



The Staff of Dempa Computerworld Inc.



Dempa Computerworld Inc. will do more than publish.

The new company set up to publish *Shukan Computer* is called Dempa Computerworld, Inc., and it will become involved in a variety of communications activities. It will conduct surveys on the Japanese computer market, hold seminars on new computer equipment and techniques, and, in early 1974, plans to run a "Computer Caravan" Forum and Exposition. Similar to the U.S. Caravan, the Japanese Caravan is tentatively scheduled for five of Japan's largest cities. Right now, *Computerworld's* U.S. and European Caravans are scheduled for 28 cities in 1973, and a total attendance of more than 85,000 professional visitors is expected.

Japanese computer market large and growing.

Right now, Japan is the largest single-country computer market outside the U.S. As pointed out by *Computerworld's* President, Patrick J. McGovern, "There are now over 15,000 computers installed in Japan, and the number is growing at over 25% per year. This growth and the current liberalizations of Japanese import policy on computer equipment makes Japan an especially attractive market for computer product and service marketers headquartered in the U.S. and Europe."

The Japan Ministry of International Trade and Industry indicates that by the end of 1975 there will be 38,000 computers worth over \$12 billion in Japan. There will also be very rapid growth in the use of peripherals and terminals, and services and contract software, providing almost unlimited business opportunities.

Shukan Computer's Circulation starts at 35,000

Initial circulation of *Shukan Computer* is guaranteed at 35,000, which provides in-depth coverage of computer users and industry personnel. Based on IDC data file lists and the resource lists of Dempa, circulation is divided about 80% to end-users and 20% to the computer industry. Circulation development methods will be the same as those which gave *Computerworld* the highest paid circulation in its field in less than four years.

Advertising in Shukan Computer is easier than it looks.

Advertising sales for *Shukan Computer* will be handled in the United States by Computerworld Representatives. Rates are reasonable, based on a CPM of \$35 (at current conversion levels—All rates are in Yen, and are estimated in dollars for convenience only). Full-page units are 9½" x 14½". Smaller units are available.

Also, *Shukan Computer* will provide translation services and aid in the establishment of marketing channels for companies new to the Japanese market.



Don't you always celebrate a birth with a cigar?

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Bits & Pieces

GA SPC-16 Minicomputer Can Use IBM 1403 Printer

SANTA MONICA, Calif. — Users of the General Automation SPC-16 computer can attach IBM 1403 printers through the Spur 1403 controller from Spur Products, Inc.

An off-line mode incorporated in the interface allows the user to print a typical spooling tape with little computer intervention, leaving the computer free to operate on other tasks, a spokesman said.

The Spur controller, with the SPC-16 interface, sells for \$11,760 from 2928 Santa Monica Blvd., 90404.

Telefile Disk for Interdata Users

IRVINE, Calif. — Telefile Computer Products, Inc. has a complete disk system for Interdata computer models 3, 4, 5, 50, 70, 74 and 80, and GE PAC Model 3010/2.

The system consists of Telefile's Model DC-16-1 Disk Controller and up to eight Telefile Model DD-215 dual density disk drives produced by Century Data Systems. The system will provide dual-density storage of up to 116M 8-bit byte/disk.

The DC-16-1 Controller costs \$8,200; the disk drives are \$22,000 each. Telefile is at 17795 Sky Park Circle, 92664.

Tape System Fits Most Minis

PLAINVIEW, N.Y. — A plug-compatible 74 in./sec tape system for most minicomputers is available from Infotec.

Tape systems are also available at lower speeds, in either rack or console cabinets, and include tape controller, interconnecting cables and all software, a spokesman said.

Prices for single-drive systems for most minis start at \$8,500. The IBM 1130-compatible system starts at \$11,000 for a single tape drive, \$15,000 for dual drives.

Lease and lease/purchase plans are also available from 70 Newtown St., 11803.

Unifile Integrates Hospital Data

KING OF PRUSSIA, Pa. — Unifile, from Shared Medical Systems Corp., is an information handling system designed for hospitals and medical centers.

Unifile is based on a single, fully automated and integrated data file. The system features a variety of input and output devices, a microfilm storage system, and a retroactive updating feature that keeps patient information current, the firm said.

Read All About It

PHILADELPHIA — Users interested in the practical aspects of information system design are offered a publication from Auerbach Publications, Inc. — "Information Retrieval" by Basil Doudnikoff — for \$19.95 from 121 N. Broad St., 19107.

Users Disagree

Have 155s, 165s Been Outdated by VS?

By Michael Weinstein
and Toni Wiseman
Of the CW Staff

A majority of users who purchased IBM 370/155s or 370/165s before the announcement of the 370/158 and 370/168 appears to feel that IBM's proclamation of virtual memory as the trend of the future will have no detrimental effect on their operations, according to a *Computerworld* survey of 15 users.

Most users were satisfied with their older machines, unimpressed with virtual memory and undisturbed by the fact that the 155s and 165s use core memory while the 158s and 168s use semiconductor memory.

Users surveyed were asked:

- Whether they had any bad feelings toward IBM for selling them a batch-oriented machine when in all probability the corporation knew the virtual 158s and 168s were just around the corner?

- If they had known the 158s and 168s were coming, would they have bought a 155 or 165?

- Did they intend to spend the estimated \$200,000 to \$400,000 to add a Dynamic Address Translation (DAT) box to their existing computers to give them virtual memory capabilities?

- Did they feel that changing memory technology between machines would reduce the future resale value of their computers?

About two-thirds of the users surveyed were content. These users stated they had bought the system to solve particular problems in their particular situations.

Typical of these users was G. Evinger, DP director for United California Bank, who noted, "It's a nice toy for programmers [virtual memory], but we don't need it. The 155 is handling our

needs and as we're doing a lot of compute-bound jobs on a larger system [with more real memory] virtual memory would not help us one iota.

"Men on our staff who had been associated with some of the software companies around the country wrote some papers and documented the fact that they thought it was an interim machine [the 155], so we went into the purchase knowing what we were doing," he continued.

And L.L. Hodge of Government Employees Insurance Co. echoed Evinger's feeling that virtual memory was not for everyone, claiming "many people won't go to virtual techniques and will be more interested in the 155 and 165."

There appeared to be no middle ground of user reaction: either users were content or they were definitely angered by IBM's apparent marketing strategy.

One disconcerted user, Dr. Stuart Schlesinger of Aerospace Corp., felt IBM was culpable in selling a machine that many users would not have bought had they known of the impending release of the 158 and 168.

"When we learned of the new release and the intention to make virtual memory standard," Schlesinger stated, "we went to IBM and they responded with long faces and no help."

When asked why the 155 would not be resalable, he explained that the change to MOS memory technology would make his core-oriented machine less desirable in the future.

"Now we're considering going to non-IBM sources for components to upgrade to virtual capabilities, and initially it looks like we may end up with a machine which is cost-effective when compared to the 158."

Microdata Unveils Mini Series

IRVINE, Calif. — Microdata has announced a new series of microprogrammable minicomputers which use an asynchronous data bus (Monobus) to channel all communications between processor, main memory and I/O modules.

The basic mini in the series is the Model 3200 which is a 32-bit microprogrammable processor with a 16-bit data path.

The Model 3230 is a microprogrammed 3200 designed to be compatible with existing Microdata 800s and 1600s.

The third model in the series — the 32/S — is designed especially to make use of Microdata Programming Language (MPL), a derivative of PL/I.

Since MPL is a block-structured language, stack processing is fundamental to the 32/S and is being used for the first time in a minicomputer, a spokesman said.

The 32/S performs arithmetic and logic operations in the stack with fewer accesses to main memory, he added.

From the basic 3200 system, other models can be configured and expanded by adding modules to the Monobus, the firm said.

Control memory for the 3200 can be made up of read-only, programmable read-only and read/write storage modules.

The 3230 architecture employs a repertoire of 110 instructions.

The 3200 includes 32 general-purpose registers and three working registers plus the data, address, instruction and program pointer registers.

All three models will be available this summer with prices ranging from \$8,000 to about \$10,000 depending on the amount of control memory.

Microdata is at 17481 Red Hill Ave., 92705.

English 155, 165 Users Alarmed by Effect of VS

While most U.S. purchasers of the 370/155 and 370/165 seem undisturbed by the later release of the 158 and 168 virtual memory computers, their English counterparts are less passive.

Users of 370/155s who were peeved at the timing of the 158 announcement worked through their IBM Computer Users' Association to get IBM to respond to various charges.

Allegations ranged from the feeling that the release of the 158 would make current machines obsolete in five years to demands for an answer to why users must pay at least \$200,000 to add the required DAT box if they want virtual capabilities.

IBM stated it reviewed each case separately and demonstrated — to the users' satisfaction — that the addition of the DAT box would still result in a cost-effective machine.

The rationale used by IBM is that a 512K 370/155 purchased at \$2,364,000, plus maintenance and \$237,600 for the DAT box and subtracting corporate tax, results in a net cost over five years of \$1,680,000.

IBM compares this with a company that starts from scratch and wants to install a 370/158. First it has to install a 512K 145 pending availability of a 512K 158. Thus, net cost over the same five years would be \$1,754,400, some \$74,400 more expensive.

Of interest is that Schlesinger was one of only two users surveyed who showed any intention of spending the additional money — about \$200,000 from IBM — for a DAT box.

Another user who was upset, but asked that he not be identified, said no indication was given to him of a future CPU release when his firm purchased a 155.

When he confronted his salesman, the IBMer said he had no knowledge of the 158 when he had sold the 155.

"While my salesman may not have known, the big guys knew and they should have told us before we paid for a machine that will be antiquated in five years," the user said.

Another user who faulted IBM, Amos Smith of Southern Natural Gas, was more philosophic and stated, "I don't like it, but I have to live with it."

One user was upset at the timing of the releases but felt the government was at fault. "In view of the way the Justice Department has imposed its will on IBM with the Consent Decree of 1956, they couldn't have done anything else but what they did do. If we've been hurt, it's the result of the consent decree," stated V.A. Courtney of Kemper Insurance.



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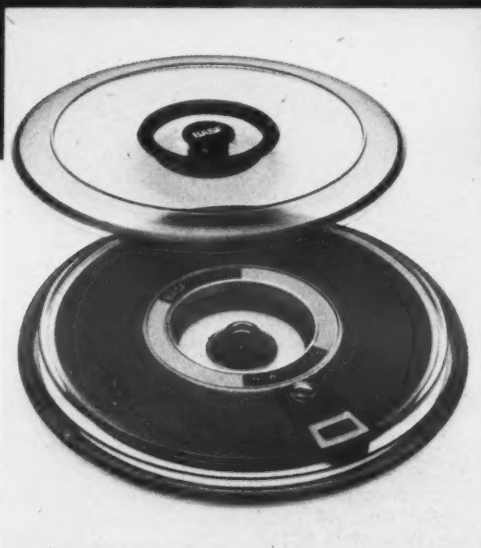
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U.S. Agency Finds 6400 Reliable, CDC Responsive

By George A. Dubinski
and F. James Hughes

Special to Computerworld

PORTLAND, Ore. — Our five-year old CDC 6400 is an interesting machine — very flexible, with an acceptable reliability record. We expect to use it for another five or more years. CDC is a responsive company with a friendly staff, but at times appears to lack the resources to go as far as we would like; i.e., it does not have a great enough variety in hardware and software. But if we had to do it all over, we would again select the CDC 6400.

The Bonneville Power Administration is a Federal Government Agency within the Department of Interior whose task is to market the electric power generated by dams of the Federal Columbia River System. Bonneville has about 3,500 employees with headquarters in Portland, Ore.

A CDC 6400 was installed at Bonneville in July 1968. It had 65K of 60-bit words of central core memory, two card readers,

two printers, 10 tape drives, a 130 M-char. fast-fixed disk and several time-sharing CRT terminals.

Bonneville purchased most of the equipment because of the cost savings over the life of the installation. Since that time it has doubled the main memory, added 250K words of secondary core memory and doubled the disk storage.

Also, the T/S network has expanded to 30 terminals, mostly CRTs operating at 2,000 baud. The 6400 is used five days a week, three shifts per day, for batch jobs, remote job entry and interactive T/S. About 65% of the work is with Fortran and 35% with Cobol.

The overall design of the system consists of a fast central processor and 10 small peripheral processors, a total of 11 computers run as a true multiprogramming system with dynamic memory allocation.

Some Reservations

The mainframe, core memories and disks are solid. The lack of a parity check in memory can leave the user in the cold

because sneaky errors may show up only as incorrect answers on job output.

Our customer engineering service has been excellent although the complex nature of the machine has led to some tricky problems that have taken a long time to cure. In summary, the hardware ranges from satisfactory to excellent.

Each of the two types of processors has its own language and each of the 11 processors functions as a completely independent computer, tied together by an executive program (monitor).

Only the peripheral processors have operations that can access the input/output units — tapes, disks, etc. Thus the central processor is free for computation. This complex of computers working together makes the 6400 an excellent computer; but sometimes cooperation is lacking.

In a system like this with many computers operating simultaneously on the same job, timing becomes a very critical item. And when timing breakdowns do occur, it is usually because of a conflict

over the use of system resources.

One of the things the software and operations people particularly like is the two large CRTs which, with the console keyboard, form the operator's interface with the computer.

True Multiprogramming

One of the outstanding features of the 6400 is that when it was delivered in 1968, it had the ability to run those seven jobs or partitions simultaneously in a true, dynamic, multiprogramming mode. (The current operating system supports 15 "partitions.")

A drawback of 60-bit words is that character manipulation (10 six-bit characters per word) is done by shifting and masking (no character hardware commands) so Cobol and other DP-type jobs run slower than they would in a character-oriented machine of similar power.

This unfortunate hardware oversight was remedied about two years ago by the announcement of a "business" box for CDC Cyber machines. No retrofit is possible for our older machine.

No compiler was operational when we bought the machine. The last five years has seen monumental effort by CDC to catch up with the rest of the industry and with fair success. One of the advantages of coming along later, however, is that it gives one a chance to profit from other user pioneering efforts. For example, CDC's indexed sequential system beats Isam hands down.

Another advantage of working with CDC is its smallness. Can you imagine the feeling of people who in the past have attended those tribal rituals called IBM user group meetings, when they realize that the actual head of the CDC group developing the Cobol compiler is willing to spend hours with them discussing problems.

Dubinski and Hughes are on the DP staff of the Bonneville Power Administration.

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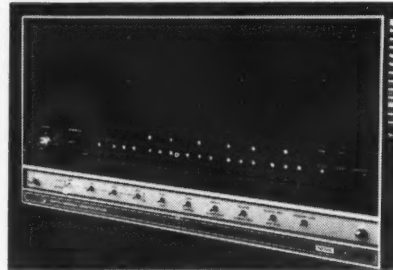
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Dual Programming Joins Nova 840 Mini

SOUTHBORO, Mass. — Data General unveiled the Nova 840 for users who want a protected dual-programming capability and/or the ability to expand memory to 128K 16-bit words.

Dual programming capability allows one user to share the computer's capabilities with a second user, or applications needing a foreground/background capability, where the foreground job has priority over the background job.

The mini operates in the dual capability



The Nova 840 can be expanded to include a 128K 16-bit word memory.

under control of the Real Time Disk Operating System (RDOS) which will support the 840 mainframe with up to 72K words of memory.

Expansion of Main Memory

The Nova 840 holds up to 64K 16-bit words of core memory in the main chassis, and permits the user to expand with add-on memory up to 128K words.

The 840 is compatible with other Data General computers in the 800 Series.

Cost for the 840 with 16K words of core memory and the hardware memory management system is \$16,530.

For use with RDOS, users must add the cost of the necessary disk subsystem. There is no cost for the RDOS software.

Production Up, Keystrokes Down

Page Reader/Mini Star at Newspaper

WILMINGTON, N.C. — During 1972 the *Wilmington Star-News*, a daily newspaper with a circulation of 36,000, increased its total production by an average of 114 pages per month over the previous year. Yet this growth did not require any additions to the *Star* production staff.

Instead, production manager George Hutchinson purchased an optical page reader system supervised by a minicomputer.

According to Hutchinson, the system can not only handle the current production rate, but can also accommodate anticipated future growth. "We would have had to hire at least four more teletype-writer operators to handle just last year's growth," he said. "With this system we've cut keystrokes on locally generated copy by 50%."

Now news reporters and classified ad takers type original copy on conventional IBM Selectric II typewriters equipped with a standard printing and publishing font. An optical scanner converts this typewritten text to clean computer tape at the rate of over 5,100 char./min.

The six-level tape is then run into an IBM 1130 which controls the newspaper's Photon and Compugraphic phototype-

setting machines.

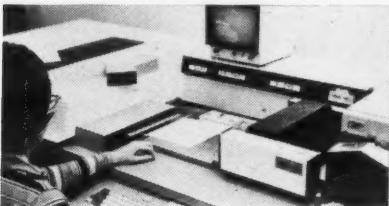
A Data General Nova 1200 minicomputer which supervises the system is equipped with 8,000 words of core memory and the necessary software to allow a typist or editor to make copy changes quickly and easily. It provides five different edit-

The Small Systems User

ing and correction modes, both on-line and off-line.

In addition to the minicomputer, the Compuscan page reader system consists of a desk-sized scanner console and a set of peripheral devices. The optical scanner uses a solid-state electronic read head for recognition. No precision focusing is required. The scanner features an optical display and retractable keyboard for on-line editing, plus a small CRT display.

Available peripherals include a high-speed paper tape punch, a paper tape reader, magnetic tape and a telephone modem.



The optical page reader system takes a standard typewritten text and converts it to computer input tape at the rate of 5,100 char./min.

Thinking DP? Don't Neglect Forms Design

BURLINGTON, Iowa — Small companies contemplating "joining the computer generation" with their first computer are advised by Gary McKune to "make sure the paperwork joins, too."

A recent conversion of an almost totally manual billing procedure to one incorporating a small computer was predicated on a desire for increased speed and efficiency, McKune, DP manager of Winegard Co., related.

The objective was to replace an awkward, 11-part form processed manually on an accounting machine, with three conveniently handled computer forms.

But the key to the success of the new machine was not only the addition of computer techniques but careful consideration of new forms design, he added.

Through consultation with design personnel from The Standard Register Co., McKune was able to make the transition smoothly and realize an overall savings of \$1,000/yr.

McKune adhered to the System/3 recommendation of a maximum of four copies per form and has implemented procedures with a two-part packing list, a four-part invoice and a two-part statement.

Restressing the importance of the forms design, McKune stated, "It is a matter of matching the hardware with sophisticated forms design and paperwork procedures."

"For example, an analysis of our old form indicated we could reduce the number of invoice copies to two. Also, because less than 20% of our shipments required bills of lading, we eliminated these copies entirely — creating a separate manual operation."

On the left side of the form, McKune lists the invoice dates, references and codes along with the current invoice amounts.

Three columns are given to aged balances — 30 to 60 days, 61 to 90 days and over 90 days. To focus attention on these, they are printed in deepening tones of a second color, red. A total is shown at the bottom.

A payment stub is on the right side of the form and can be removed easily.

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Managers Brace for Future DP Shock

BOCA RATON, Fla. — "Future shock" may have only just begun to set in in the U.S. with respect to the world of the computer, according to discussions held here by some DP executives, members of the advisory council on management systems and sciences to the American Management Association.

Changes in the management systems field are coming "computer-fast," and the need is urgent for competent, qualified personnel, particularly at the management level, according to the council.

The management of systems, it was pointed out, has been perhaps the weakest link in data processing operations to date, with far greater emphasis having been placed on technology, hardware and technique than on people, especially the user.

Tomorrow's need, the executives pointed out, is not so much for information or intelligence, but what to do with it. The role of "data manager" in future systems, they said, is crucial as

those systems increasingly incorporate the use of highly sophisticated minicomputers in complicated hookups for distributive information systems.

Tomorrow's world of distributed intelligence, they claimed, will find information turned on like electricity. Minicomputers will cost less than today's electric typewriter — and will be just as much a convenience item.

Long-range planning and the recruitment of first-rate personnel, however, are essential to map these new systems.

American management, the council said, will have to "think things through" and relate the capabilities of these new systems to the problems that will be at hand — "an area in which we have been remarkably remiss in large measure."

The council also discussed the growing need for legislation protecting the rights and privacy of the individual as the information explosion continues and widens.

One 'Lunar' Step May Be a Leap For Input of 'Natural' Language

By Ken Shonk
Of the CW Staff

CAMBRIDGE, Mass. — Geologists at the second annual Lunar Sciences Conference in Houston recently made the most of the opportunity to talk directly to a computer in English and access all the chemical analysis measurements on the Apollo moon samples.

"They became so interested in asking questions that they forgot they were using ordinary English to query the computer," said William Wood, a senior scientist at Bolt, Beranek and Newman here and one of the developers of the Lunar Sciences Natural Language Information System (Lunar).

The Lunar program's success brought the development group to work on a program for continuous speech understanding for the Advanced Research Projects Agency (Arpa) network, using Lunar's semantical and syntactical (meaning and structural grammar) system as the

base for their approach. The BBN group, said Wood, is shooting for speech input into a computer for a large variety of subject areas.

"English (or any spoken language) is a natural for use with computers," he emphasized.

He said the need exists because of Arpa and similar systems. "Someone can get on a computer 3,000 miles away and have no technical assistance available for the system the particular computer uses."

Although the Nasa-sponsored prototype development is probably not a system geologists will use, the Lunar project was aimed at real people. It allowed geologists to access 13,000 measurements with questions such as, "what is the average concentration of aluminum in high alkali rocks?" or "what are the potassium-rubidium ratios for breccias?"

'Breadboard Structure'

"Since we had no restrictions on memory or efficiency," Wood explained, "the entire program has a breadboard structure, built up gradually by accumulation. The average question takes 10 or 15 seconds of central computer time to pass through the program which is written in BBN Lisp for a PDP-10 running on Tenex time-sharing. We could cut the time by a factor of 10 or 100 if we reprogrammed in machine language."

The system's data base was constructed to correspond to the way geologists were expected to speak, with a vocabulary of about 3,500 root words and complex English grammar.

Bureau Caters Only To Blind DP Users

WATERTOWN, Mass. — A service bureau has been started here to cater solely to blind users.

The basis of the American Systems, Inc. system is the use of audio response as the standard output media.

Users access the central computer from any remote location with a standard-type terminal. The blind user then transmits his inquiries or commands by typing requests from the keyboard.

The audio-response facility responds to the typist by telling him what he has typed — to verify input — or giving him the results of indicated commands or computations.

Other optional outputs available to the blind user are Braille copy or an ink-print copy.

For example, a secretary using the system is provided with a program enabling her to type letters, articles or other office material. She may proofread her work, make corrections and request printed copies on office letterhead stationery.

Testing has shown that blind persons with no computer background can be trained to use the system effectively in a few hours, the developer said.

Hardware consists of two interconnecting digital minicomputers. The first is an audio-response unit which receives information from 16 or more remote terminals and transfers the information into voice for immediate playback to the user. Speech information is stored on a disk subsystem.

The other minicomputer is dedicated to applications and operates with service bureau programs.

The basic applications system is a Data General Nova 800 with 16K of core memory, a high-speed disk with 512K words and a moving-head disk for data storage.

Under present funding, each user pays an initial cost of \$450 for his console unit, constructed with either a standard or Braille keyboard.

He then pays an hourly rate of \$1.50 for use of the computer.

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For Academic, Business Environment**Improvements Boost APL Availability**

Until recently, discussions on the elegance of APL were similar to discussions on the benefits of mingling with the jet set; although delightful to contemplate, the experience was just not accessible for all those who would like to benefit by it. Since APL was originally available only through IBM and since, unlike the industrial market, the college and university market is not dominated by IBM, APL was not available to most instructors and students.

Whether an appropriate substitute for "jet-setting," APL is now available for a much wider range of users. Granted, some APL systems provide less than the full capability of the language; nevertheless, the APL experience is available for most persons in the academic and business environments.

Although proponents of Algol and Fortran may scoff at the descriptive term "experience," advocates of APL insist that the language is the nearest form to machine-independent communication, a truly unusual experience.

As proof, some persons are so desirous of utilizing APL that they will even use a non-APL teletypewriter keyboard, resorting to all forms of strange combinations of characters to simulate APL symbols.

Improvements in the Terminals

Belatedly, the Teletype Corp. has announced the availability of APL keyboards. Other terminal producers have followed suit. For the results of a survey of APL-compatible terminals, see the article by H.P. Macon in *Sigplan Notices*, Vol. 6, No. 10, pages 78-86 (a publication of ACM, 1133 Avenue of the Americas, New York, N.Y. 10036).

Likewise, APL interpreters are being developed for a variety of non-IBM computers; in particular, for some configurations produced by Xerox, Burroughs, Digital Scientific and Honeywell.

Finally, many APL time-sharing services have sprung up, providing support to campuses where APL capability is not available through the computer center. In addition, services are now available in Europe and Australia.

Improvements in the Language

The very dedicated and enthusiastic APL user group is constantly developing sophistication in the language and software. For example, APL capability with file system now exists, making the language much more appropriate for business and social science applications.



**J. Daniel Couger
On
Education**

Language improvements are reported in *Quote-Quad*, a publication of ACM. The publication also provides sections on APL algorithms and APL student problems.

A final illustration of the missionary zeal of APL users is provided by the list of approaches to "selling APL," derived from a Share APL/Project:

- Hold back exposure to a full APL program and do not introduce all the symbols too fast.
- Give a live terminal demonstration — a purposely tailored mini demonstration package proves particularly useful.

• Users want *their* problems solved. A communication problem exists between the application of real needs and the formulation of the program. Selling APL is getting involved in applications.

• Where a choice has to be made between TSO and APL, stress that the logic of a Cobol program, for example, can be developed in APL on-line and the detailed coding written in batch mode almost bug-free.

Couger is professor of computer and management science at the University of Colorado.

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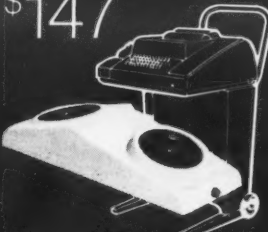
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Afips Sets Up Hotline For NCC Registration

MONTVALE, N.J. — Advance registration for the National Computer Conference and Exposition, June 4-8 in New York City is now possible through a "hotline" number to the conference sponsor, the American Federation of Information Processing Societies (Afips). The number, set up for residents of the Continental U.S., except residents of New Jersey, is 800-631-7070, while New Jersey residents should call the Afips business number, 201-391-9810.

Callers will be sent the conference program and registration and housing forms. The cutoff date for advance registration is May 15.

The fee for the conference is \$50 for Afips members and \$60 for non-members. The fee includes the \$40 price for the copy of the proceedings. A one-day pass to both the exhibits and the programs is \$20 while a five-day exhibits-only pass is \$15. A student pass is \$5. Afips is at 210 Summit Ave., Montvale, N.J. 07645.

Acpa Takes Privacy Stand, Forms Committee

KENSINGTON, Md. — The Association of Computer Programmers and Analysts has established a standing committee on privacy and published a position paper on privacy.

The group intends to serve as a collection and dissemination agency on information concerning the privacy issue.

On the premises that an individual is

• All information stored in a data bank must be marked either as "hearsay" or "documented" (i.e., notarized).

• An individual must be able to change or delete all hearsay information about him in any data bank at his own discretion.

• If an individual disagrees with documented information kept about him, the collecting body must prove that this in-

formation is valid.

The group further stated: "Any criticism of these requirements, such as 'these points would make it impossible to run a data bank,' should be met with the reply that if you cannot safeguard the civil rights of the individual, then you should not maintain a data bank."

Acpa can be contacted through P.O. Box 95, 20795.

Societies/ User Groups

innocent until proven guilty, and should not be required to prove his innocence, the group recommends the following:

• All data banks must be registered with a central regulatory agency and their existence be made public.

• All citizens must be made aware that they may examine data in dossiers compiled on them.

• Access to all detail-level data must be made economically accessible to each individual.

Microfilm Show a 3-Track Affair

SILVER SPRING, Md. — "Compact Efficiency" will be the theme of the 22nd Annual Conference and Exposition of the National Microfilm Association, April 10-13, at Detroit's Cobo Hall.

This year's session areas range from the fundamentals of micrographics to highly sophisticated systems applications. A three-track approach will allow participants to select the sessions best fitting their individual needs.

The Track No. 1 fundamental sessions

are designed to provide an overview of microfilm for those interested in obtaining a basic working knowledge of the technology. The seminars in this track will cover retrieval systems, fundamentals of COM and systems design.

A case studies seminar on the third day will look at applications in the fields of engineering, medicine, banking, insurance and proprietary micropublishing.

The intermediate sessions of Track No. 2 will start out with a seminar analyzing information problems. John Rymer, Florida Power and Light, will discuss the role of the system analyst, project planning and the gathering and organization of data for microfilming.

Wednesday's sessions will include an overview of COM, with an analysis of available hardware and software.

Thursday will be devoted to COM systems design, covering cost comparisons, microfilm preparation and system evaluation.

The final day's seminar will deal with COM applications and trends.

Track No. 3 advanced sessions will feature panel discussions. "Micrographics in Perspective" and "Information Technologies — Competing or Compatible?" are the topics for the first day of the conference.

Office systems and Microform/Computer interface are the scheduled subjects of the Thursday and Friday seminars.

Further information on the conference may be obtained from National Microfilm Association, 8728 Colesville Road, 20910.

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\$9,800) costs less than \$250 per month, plus maintenance if desired. The same system, on a month-to-month basis, with maintenance, costs about \$784 per month. Or, under a rental-purchase agreement, it's \$980 per month, with a full 80% applied to your purchase after six months. For complete details, just write or call. We'll send along a detailed brochure.



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Asis Paper Contest Gets May 1 Deadline

WASHINGTON, D.C. — May 1 is the deadline in the American Society for Information Science contest for student papers.

The contest is open to Asis members who are student members in 1973, or were so in 1972; papers may be on any topic of interest to information scientists.

The contest winner will receive round-trip travel expenses and full registration for the 1973 Asis annual meeting in Los Angeles, Oct. 21-25.

More information and contest rules are available from Robert McAfee Jr., Asis, 1140 Connecticut Ave., N.W., Suite 804, 20036.

NMA, Uaide May Affiliate

WASHINGTON, D.C. — Terms for affiliation have been agreed upon by the boards of directors of the National Microfilm Association and the Users of Automated Information Display Equipment.

Formal balloting for ratification of the affiliation will be conducted by both groups soon after the NMA annual conference, April 10-13.

"The unification of NMA and Uaide will enable both groups to serve their members better, as well as to promote the technology, growth and development of micrographics and the industry," said Milton Mandel, NMA president.

According to Uaide President Mel H. Rice, the proposed affiliation would make the COM user group "the nucleus of NMA's first division, tentatively named the Computer Image Processing Division."

Chicago Conference

ACM Looks at Virtual Memory

CHICAGO — The North Central Region of the Association for Computing Machinery will hold a conference on virtual memories and systems May 18 and the morning of May 19 at the La Salle Hotel here.

Designed for EDP managers, systems analysts and applications and systems programmers, the conference will include presentations on techniques for evaluation of virtual memory cost/performance and on systems productivity. Other discussions will cover programming and systems design techniques to enhance performance under virtual memory.

Tony Dundzila, conference general chairman, stated that the conference provides both the technical understanding and the managerial perspective needed to evaluate, select and install virtual memory systems. Virtual memory systems offered by all major computer vendors will be included, organizers said.

Conference costs are \$40 for ACM members and \$50 for others. Further information can be obtained from Tony Dundzila, data systems and services manager, Purdue University Clumet Campus, Hammond, Ill. 46323.

Hopper Award Nominees Wanted

PROVIDENCE, R.I. — ACM is soliciting nominations for the Grace Murray Hopper Award for the outstanding young computer professional of the year.

The recipient, who must be 30 or younger, will be selected on the basis of a single, recent, major technical or service contribution.

Nominations should be accompanied by a detailed description of the accomplish-

ment, and a biographical sketch of the nominee, including date of birth.

Deadline for the receipt of nominations is April 30.

They should be mailed to Prof. Walter Freiberger, Center for Computer and Information Science, Brown University, 02912.

Paper Industry Talks DP

CHICAGO — The Fifth Annual EDP Conference of the Paper Industry Management Association, here, April 10-11, will focus on practical, implemented, paper industry applications.

This year's presentations will stress the role of the DP user in the development and implementation of DP systems.

Discussions about paper industry systems and procedures will be of interest to all DP users, DP specialists, or managers within the paper industry, according to R.T. Reilly, 1973 conference chairman.

The association is at 2570 Devon Ave., Des Plaines, Ill. 60018.

Board on Social Implications Of Technology Formed by IEEE

NEW YORK — An Ad Hoc Committee on Social Implications of Technology (C-Sit) has been formed by the Executive Committee of the Institute of Electrical and Electronics Engineers (IEEE).

The committee's purpose is to provide a forum for discussion on topics ranging from: professionalism and social responsibility in engineering; understanding the interaction between technology and society; and predicting the impact of technology on society.

The group is publishing a newsletter, which may be obtained from 345 E. 47th St., 10017.



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Computerworld's communications specialist, Ron Frank, takes a close look at this very complicated area in our April 25 supplement. It will include information on how to go about configuring a data communications network that will solve your particular problems. We'll describe some successful communications networks and discuss the utility of various kinds of equipment. When we put it all together, you'll have an excellent overview of this increasingly important EDP tool.

If you're marketing communications equipment, your ad should be there when our April 25 supplement goes out to more than 50,000 paid subscribers. Closes April 6.

For details, contact the nearest Computerworld representative: Boston: Bob Ziegel, (617) 332-5606. New York: Don Fagan, (212) 594-5644. Los Angeles: Bob Byrne, (213) 477-4208. San Francisco: Bill Healey, (415) 362-8547. Or write to: Judy Milford, Computerworld, 797 Washington St., Newton, Mass. 02160.

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WEEKLY FOR THE COMPUTER COMMUNITY

CI Notes

Nixdorf, Entrex Sign Pact

BURLINGTON, Mass. — Entrex, Inc. has signed an agreement with Nixdorf Computer AG for the annual sale of \$4 million worth of equipment.

The agreement, valued at \$8 million, gives Nixdorf exclusive marketing rights to the Entrex 480 key-to-disk system in continental Western Europe, Australia and South America. The system will be called the Nixdorf 620, and marketing will begin in German-speaking countries.

The agreement also provides for joint product development and research efforts.

Data Products Printers in Japan

WOODLAND HILLS, Calif. — Data Products Corp. has licensed Tokyo Juki Industrial Co., Ltd. to manufacture line printers for the Japan and Far East markets.

Tokyo Juki will manufacture the 2000 series of medium- to high-speed printers. Data Products will continue to manufacture its Mark IV hammer banks used in the machines. The printers will be marketed by Marubeni Electronics Co.

WU Encourages Competition

UPPER SADDLE RIVER, N.J. — Western Union Telegraph Co. has encouraged other retailers of teleprinter terminal equipment to compete for the market of customer-provided terminals linked to its Telex and TWX networks.

"We believe that retail suppliers have the capability of providing rapid growth to our integrated network, allowing Western Union to concentrate its capital and engineering on expansion and improvements to the exchanges and transmission facilities," explained Delmar Harmon, group vice-president, exchange services.

Supershorts

Ampex has licensed Xerox to use its single-capstan drive patents for tape drives.

Optical Scanning Corp. has licensed Data Business Forms Ltd. as Canadian representative for its OCR and optical mark reading forms.

Teijin Advanced Products Corp. a subsidiary of Teijin Ltd., will market Microdata Corp.'s Series 1600 minicomputer in Japan.

Measurex Corp. has agreed to purchase Versatec, Inc.'s Matrix 200A printer/plotters for incorporation in its process control system.

Tally Corp. has signed a \$600,000 contract for the sale of Tally Series 2000 line printers and Datascribe terminals to Japan Radio Co., Ltd.

IEEE Attendees Told

New Firms Should Avoid IBM Competition

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK — There are significant opportunities for new firms in the computer field today as long as they do not compete directly with IBM, panelists at an IEEE/Intercon session here agreed.

The panelists agreed that entry into the computer business was relatively easy and that financing was available for new firms with unique ideas.

However, they warned against direct competition with IBM in any area and outlined future possible problems for the new businesses in the data processing industry.

Ryal Poppa, formerly with Mohawk Data Sciences, who recently formed his own firm to compete in the peripherals area, noted it is "one thing to compete in the DP industry and quite a different one to be successful."

He said the definition of success in the industry was the profit line and continual profit growth.

Those who have been successful and shown profit growth have done so "either because of forbearance on the part of

IBM or legal constraints on IBM," he noted.

Once a firm is established in a unique non-IBM segment of the market, it would be very difficult for IBM to knock it out of that market, he said, even though IBM's entry might slow down its growth.

He suggested that areas where IBM is not strong are small ticket or low price items that are hard for the IBM salesmen to sell.

However, he warned, IBM might be developing a lower-priced sales staff to handle these items and said this could cause problems in the future.

IBM reacts to competition when it feels its profit projections will not be met and not specifically when it sees its share of markets declining, he pointed out.

Secret to Success

Poppa said the two secrets to success, in addition to not competing directly with IBM, are strong marketing and sound financial plans to enable a firm to compete in the lease oriented computer business.

Dan McGurk, president of the Computer Industry Association, noted that while the computer industry was a highly concentrated one, relatively easy entry into the marketplace still exists for many firms.

But, he indicated, the easy entry could sometimes be a trap because manufacturing costs are a small part (20%-25%) of the selling price of products in the business.

So while a firm might be able to build a product and enter the market fairly easily, it would be much harder for it to stay in the market for a long time.

In order to get a significant volume of sales, he indicated, a firm would probably either have to be acquired by or else acquire a larger entity with the financial muscle to allow it to compete in the capital-intensive computer business.

Nooks and Crannies

Dave Goodman of Goodman and Mautner, a venture capital firm, told the group there are many holes in the market that are noncompetitive with IBM or are compatible with IBM marketing strategy.

Venture capitalists look for firms that will compete in these non-competitive areas, he said.

Even though investors seem somewhat disenchanted with the computer business today, he said, "there is always plenty of money around for a good deal."

Generally, he said, venture capitalists like to see a firm with some edge in the market such as a patented product, and one with good management skills.

However, Goodman noted, there is some concern over whether the public market will hold up for computer related stocks. He said Wall Street was very down on computer stocks at present, and noted that if the market for such stocks drops radically, venture capital will dry up for new computer industry firms.

New Pack Design on IBM 3340 Leaves Independents Troubled

CW Washington Bureau

WASHINGTON, D.C. — The long awaited IBM announcement of the 3340 disk unit [CW, March 21] has produced somewhat of a dilemma for the independent disk makers.

They had generally expected a system with double the recording density of the IBM 3330, which the 3340 has, and were readying products to compete with it. However, they did not expect a unit with

bytes, while the 3340 holds up to 69.8M bytes.

The Vermont 5018 uses a hybrid configuration, combining a 5440-type pack with a 3316-type disk which is designed for the 3330 disk system, a Vermont spokesman said.

But in the past, manufacturers have found it hard to attract user interest in products that were not strictly compatible with the IBM units being replaced.

In fact, the independent 2314-type disks, which were not plug-to-plug replacements for IBM's product, were only moderately successful for most of the manufacturers in the business and were viewed primarily as a stopgap measure until the independents could get their own 3330-like devices on the market.

Users Leery

Users, manufacturers said then, seemed to be leery of devices that were not offered by IBM.

However, the 3340 offers most manufacturers a chance to come into the market with a comparable product early in the life of IBM's product, while some might have to wait and delay their entry if they decide to produce an exact replica.

"Our problem," one said last week, "is whether the market has matured to a point where the user will accept a product from an independent that is not made by IBM."

Marketing Analysis

the new pack design that IBM incorporated in its new device.

So the problem now is whether to introduce a comparable unit that is not strictly compatible with the IBM unit or to offer an exact replica of the IBM device at a later date.

One Vendor Decides

Vermont Research Corp. has decided to offer a comparable product and is already on the market with one — in fact, it was three months ahead of IBM in offering a device which gives users the same performance and density as the IBM unit, but does not use the same type of disks.

The Vermont Research device uses a pack that costs \$350 compared with \$2,200 for a 3340 module. The capacity per drive of the Vermont unit is 62.2M

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Industry Not Responsible for Use Of Products, SDC Head Maintains

By Marvin Smalheiser
Special to Computerworld

LOS ANGELES — The problem of transferring aerospace computer technology to business and commercial uses could well pose a greater problem — are the new applications good for society?

That was the feeling at a meeting of the Los Angeles Chapter of the Association for Computing Machinery, when a talk by Dr. George E. Mueller, president of System Development Corp. (SDC), evolved into a discussion of the computer industry's responsibility to society.

"I don't think it is the proper role for a corporation to decide what is good and what is bad for society," Mueller said.

"It is a mistake, in my view, to think that industry should override the desires or wishes of the public. Industry ought to

be a responsible citizen, but it should not be the decision-making citizen as to how products are used."

Mueller was asked about uses of computer technology for applications such as those involving giant data banks. The industry should make the government aware of the dangers, it was said.

But Mueller, who described the federal and state governments as a "silent partner" of industry, said the corporation is not a "super being" and is "not responsible for anything other than the quality of its products... not the uses... nor can it be."

"Industry doesn't have any more responsibility to the body politic than handing over half of what it makes... right off the top," he said.

More Research Needed

Mueller called for a greater research effort, saying there is a "need for a continuing infusion of new technology," especially with the pressure on the nation's resources."

He predicted a growth in government spending on computer products of 20% per year in real dollars over the next five to 10 years since the lack of funds requires greater efficiency.

Formerly an associate administrator for manned space flight at Nasa, Mueller described the development of a 1-in. cube computer for Apollo and said it could be adapted for home use or for design purposes in industry.

The benefits of the transfer of technology, Mueller said, are often obscured by the 10- to 20-year time lag from the inception of an idea until it becomes a product.

SDC is now doing 87% of its business with the government — 75% of it with the military, Mueller said.

Fairchild to Produce Two GE Components

MOUNTAIN VIEW, Calif. — Fairchild Camera & Instrument Corp. has agreed to take over the manufacture of GE's GE-PAC and GE-TAC control and communications components.

Under the agreement, Fairchild said it will set up a subsidiary in Phoenix which will use GE's manufacturing facilities.

The products are used in GE systems to monitor and control electric utility plants and other industrial processes.

GE will continue to design and maintain such systems and to distribute the GE-PAC and GE-TAC products, the firm said.

Fairchild will initially own 81% of the new subsidiary, with GE retaining the other 19%. Fairchild has agreed to acquire that portion by the end of 1977, and to pay GE about \$8 million.

Orders & Installations

Brooklyn College, Brooklyn, N.Y., has installed Education and Economic Systems, Inc.'s Base Data Extractor program to be used in demographic research projects by faculty and students.

Butte Knitting Mills, Spartanburg, S.C., ordered a Univac 9400 to be used for inventory control, sales analysis, payroll and general accounting.

The Old Stone Bank, Providence, R.I., has signed an order for Datatrol TIS-370 Teller Information Systems to be installed in 28 branches throughout the state.

The Military Traffic Management and Terminal Service, Washington, D.C., has installed a Burroughs B5500 to expand its program of developing an integrated transportation data system.

Government Employees Insurance Co.

has installed a Control Data 921 OCR Document Reader to help process premium notices and policyholder inquiries concerning rates and coverage.

Boise Cascade has purchased the AR-70 Accounts Receivable Software System from Computer Systems and Education Corp. The system will be used in Boise Cascade's Container Division for management reporting functions.

Fruehauf Corp., Detroit, has installed Action Communication Systems, Inc.'s Telecontroller communications processor to manage data traffic throughout the firm's 167 offices and plants.

The Carolina Bank of Sanford, N.C., has installed an NCR Century 200 system as the nucleus of a central information file to process checking and savings accounts and mortgage loan payments.

Expansions

The Weiland Computer Group, a banking software firm, has relocated its headquarters to a Schiller Park, Ill., office.

Intermark Electronics, distributor of high-technology semiconductor devices, is expanding its Santa Ana facility to establish one centralized location serving the Los Angeles area.

Computer Machinery Corp. has moved its corporate headquarters to 100 Wilshire Blvd., Santa Monica, Calif., and consolidated its manufacturing, training and service facilities.

Beehive Medical Electronics Inc. has a new Salt Lake City facility to house its marketing, engineering, accounting and prototype fabrication departments along with corporate headquarters.

Inforex, Inc., manufacturer of shared-processor data entry devices, is leasing a new building to expand its manufacturing and warehousing facilities to 130,000 square feet.

Tesdata Systems Corp. has opened a new office in Ontario for the marketing of its products in Canada.

Basic/Four Corp. has leased a 22,000-sq-ft building in Anaheim, Calif., for portions of its small business computers manufacturing operations.

Centronics Data Computer Corp. is constructing a 24,000-sq-ft plant addition for production of its serial impact printers.

Odec Inc., manufacturer of line printers, has acquired a 20,000-sq-ft plant adjacent to its present facility in Warwick, R.I.

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If Graham Magnetics determines that the tape has no manufacturing defect or has been damaged by the User, or his equipment, the tape will be returned to the User and the User will assume the transportation charges (both ways). The remedies for breach of warranty, set forth herein, are the sole and exclusive remedies of the User, and in no event shall Graham Magnetics be liable to the User for damages of any kind other than specified herein. The warranty expressed herein is in lieu of all other warranties, expressed or implied, and no other affirmation of fact or promise made by word or action shall constitute a warranty. This warranty shall terminate with respect to each reel of Epoch 4 tape twenty years and one day from date of shipment from Graham, Texas.

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Contracts

The Rand Teleprocessing Division of Brandon Applied Systems, Inc. has received a contract from the Hartford Insurance Group to convert its Bond Investment System to a 370 operation.

Computer Sciences Corp. of Falls Church, Va., has been awarded a contract by the Communications Satellite Corp. to design a data transmission error rate monitor for the International Telecommunications Satellite Consortium (Intelsat).

Western Union International will provide seven alternate voice/data circuits for Nasa's Skylab program. The circuits will connect a terminal on earth to the manned space station for transmission of scientific data.

Raytheon Data Systems signed a \$2.6 million contract with the Midwest Stock Exchange for PTS-100 programmable terminals to be used in the exchange's order-processing and communications network.

Orbit Instrument Corp. has received a contract from IBM for magnetic variation and slew control units to be used in its Grumman A-6 aircraft computerized system project.

System Development Corp. has been awarded a multimillion dollar contract by the U.S. Air Force to develop, install and test an integrated satellite data processing system at the North American Air Defense Command's Cheyenne Mountain complex.

Century Papers, Inc. has signed a facilities management contract with Sterling Computer Systems Inc. for billing and inventory services.

Era of 'Involved Vendor'

Mixed-Media Growth Tied to Applications

By E. Drake Lundell Jr.

Of the CW Staff

BURLINGTON, Mass. — The day of mixed-media data entry systems combining OCR and key entry is definitely here, but the market for such systems is highly applications-dependent, according to J. Robert Taylor, vice-president for marketing at Inforex here.

The time has come for people in the data entry and data management fields to "look at alternative ways to capture and use data," Taylor said in a recent interview.

There is presently enough knowledge of OCR to begin to combine the technique with key entry devices and to "start looking for and finding applications that need a better way to handle and capture data," he asserted.

This was the strategy followed by Inforex, he noted, in introducing the Key-scan system aimed at large users of turn-around documents such as banks and credit card companies.

But, he noted, the mixed or multimedia systems have to be aimed at specific markets and applications. He indicated that the mixed-media systems might not be ready yet to operate in a strict key-punch replacement mode.

In addition, he predicted, the future product lines of both Inforex and the other successful firms in the data entry business will have to follow the same applications orientation if the firms are to remain successful in the business.

Complete Packages

"We will have to stress applications orientation," he said, "and offer users complete hardware and software packages that solve their individual applications problems."

Talor does not foresee the day when OCR will begin to replace key entry devices, but rather he sees the two co-existing.

The prime growth in the data entry business, he indicated, will come in the areas of mixed-media systems and with systems that have a communications capability, even though he predicted the growth in the straight keypunch replace-

great burden on the manufacturer because the manufacturers will have to know the applications and the industry they serve as well as possible, he noted.

They need this knowledge, he said, so they can develop systems requiring little or no programming on the part of the user. The days of just giving a system to a user and expecting him to program it are over, he said.

The vendor has to completely package the system for the user, he said, which will call for "a certain amount of vendor responsibility" for how the system actually works.

In addition, Taylor said, data entry people should not be extremely worried about the threat from on-line data entry to the more traditional types of data capture since many users really do not need on-line systems and are buying only what they need.

He also indicated the processors in the key-to-disk systems might get more powerful in the future to help meet users' new needs.

In the future, manufacturers may want to develop systems that also enable the user to use the data more efficiently, such as massaging small data bases at the point of the data collection.

He indicated a data management concept appeared to be viable and that there were a lot of specific applications for such a concept or system that would help firms cut down on their paper output and put data bases at the remote locations where they are often needed.

Inforex is looking closely at the data management area because "why stop with the input, when we can also find ways for users to use the data more effectively," he said.

Marketing Profile

ment business would remain strong in the near future.

This is because, he said, mixed-media systems and communications capabilities open new market areas to the data entry companies that they could not have penetrated with the older types of systems.

Market Still Young

However, the key-to-disk market in the traditional sense is not drying up or peaking, he said, disagreeing with some market forecasts which see it peaking in about 1975.

Presently, he said, the key-to-disk makers have only penetrated about 15% to 20% of the true keypunch market, which is defined as installations that have over 7 keypunches installed.

He said the recent move by IBM into the business helped confirm the view that it was a market that would be around for quite a while.

But in order to keep the market growing, the manufacturers will have to be innovative in developing applications oriented products, he said.

The requirement of developing systems for specific applications places a

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Report Sees \$25 Million by '75

DP Enlarging Role in Patient Monitoring

NEW YORK — The data processing equipment sector of the patient monitoring systems market will reach \$25 million by 1975, a 400% growth over its 1972 base, according to a report by Frost & Sullivan, a market research firm here.

However, the combined DP sector will level off and remain essentially the same through 1980. But the various segments within the DP segment show considerable changes in rates of growth. Time-sharing, which currently has sales estimated at \$500,000, is expected to reach \$5 million in 1975, a 900% growth rate, and spiral to \$10 million in 1980, for a 1,900% growth rate compared with its 1972 base, according to the report.

Hardware sales will initially grow to \$15 million in 1975 from its 1972 base of \$3 million, a 400% increase, but decline by 1980 to \$7.5 million, or 150% growth compared with 1972, the report stated.

The report cited "full market penetration" and substitution to T/S services as reasons for the decline in sales volume of hardware.

Software, which is becoming an increasingly important com-

ponent of systems in the medical field, will reach \$5 million in 1975, a 223% growth rate over the 1972 base of \$1.5 million, and keep growing to \$7.5 million by 1980, a 400% rate over its 1972 base, the firm said.

Data processing will continue to hold an increasing share of expenditures made in the total patient systems monitoring field, growing from \$5 million of the total \$98.5 million in 1972 to \$25 million of the total \$158.5 million projected for 1975.

In 1980, \$25 million in DP expenditures will still comprise a significant part of the total \$181 million market, the report indicated.

"The key to a widespread acceptance of data processing in the industry is good software," the report noted. Most manufacturers' sales have been to "research" facilities who then "develop their own software, either with the manufacturer, a private software house or their own staff."

Time-sharing sales are expected to expand dramatically as hospitals understand the economics of a T/S system and as T/S EKG services "gain wider application and are expanded to cover other physiological parameters."

The report noted that the DP segment of the patient monitoring systems is "still a very small new market," with 1972 the first year manufacturers began to sell their systems commercially.

Although physician acceptance of the systems appears strong, two drawbacks to growth could be that the systems would give doctors and nurses "more information than they are capable of

understanding" and "in situations where the computer may be used for diagnosis and dispensing (blood and drugs, etc.) the programs still need further refinement to eliminate machine and programming errors," according to the report.

Patient monitoring systems are defined as linking bedside monitoring devices with a terminal (usually CRT) at a central console station.

IBM Gets NOAA Nod for 360/195s

SUITLAND, Md. — The National Oceanic and Atmospheric Administration (NOAA) here has ordered two IBM 360/195 computers to aid in its weather prediction and research programs.

The computers carry an overall price tag of \$22.7 million over the next five years, the General Services Administration said in announcing the contract, and will increase the computer power at Suitland by a factor of five. The 195s replace two Con-

trol Data Corp. 6600s.

The systems will be used to analyze global weather observations and prepare forecasts, process triangulation data for Earth measurement studies and for mathematical modeling of hurricanes, NOAA said.

The increased computer capacity will allow the organization to run complex global weather forecasting models that have been developed but which could not be run previously for lack of computer power.

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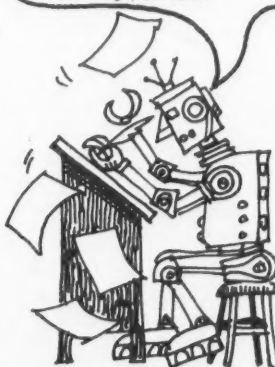


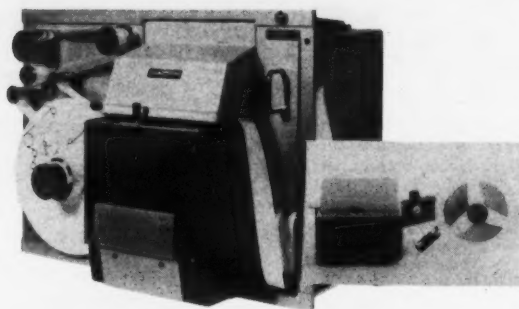
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Earnings Rise at 3 Time-Share Firms

The timesharing segment of the computer industry seems to be sharing in the upward thrust of the economy, judging from reports by Comshare, Inc., Rapidata, Inc. and Keydata Corp.

Comshare's earnings in the six months ended Dec. 31 jumped to \$270,258 or 22 cents a share from a loss of \$15,880 or 2 cents a share in the comparable year-ago period. Revenue rose to \$4 million from \$3.2 million last year.

In the second quarter, earnings rose to \$146,785 or 12 cents a share from \$88,408 or 8 cents a

share in the comparable 1971 period.

Revenues climbed to \$2.2 million from \$1.7 million.

The reported increases in revenues and operating profits were "as expected" and further increases, although at a lower rate, can be expected during the balance of the fiscal year ending in June, according to President Richard L. Crandall.

Rapidata showed earnings for the year ended Dec. 31 rising to \$1.1 million or 58 cents a share compared with \$567,644 or 33

cents a share the previous year. Revenues increased to \$7.7 million from \$5.4 million.

Rapidata Software Costs

Rapidata expensed about \$600,000 in software development costs during the year, and results should begin to appear in the current year with the full-scale marketing of new application packages, according to President Stewart B. Gold.

The firm plans to install a Decsystem 1070 and an IBM 370/145 during the year, he added.

Keydata scored a record second quarter and six months ended Jan. 31. Revenues in the quarter totaled \$2.3 million, a 28% gain from \$1.8 million in the comparable 1971 period.

Earnings jumped to \$201,000 or 7 cents a share from \$42,000 or 2 cents a share.

In the half year, earnings totaled \$377,000 or 13 cents a share compared with \$140,000 or 6 cents a share in the year-earlier period. Revenues rose 27% to \$4.4 million from \$3.5 million.

New customer contracts in the first half were substantially above the total in the corresponding period a year earlier, according to President John T. Gilmore Jr. "When fully implemented, these contracts will generate approximately \$2 million in repetitive annual revenues," he added.

Nine-Month MDS Earnings Plummet, Costs of Rental Program Cited

UTICA, N.Y. — Nine-month earnings at Mohawk Data Sciences Corp. plummeted to \$55,000 from \$1.6 million in the year-ago period.

The earnings reflect the high costs of establishing a rental base with the System 2400 as well as the cost of normal discontinuances in the Data Recorder base, according to President R.P. Rifenburgh.

Leaning Toward Leases

"Despite the broadening of our markets for outright sales," he said, "we expect that the System 2400 and other rental programs will impact our lease-to-sales ratio heavily toward leases over the next several quarters. The front-end costs of building a new lease revenue base has tended in the past to obscure MDS's dedication to profitability."

"We have restructured our organization and resources and instituted significant cost reduction programs to capitalize on our rental base and achieve our profit objectives. We believe those objectives will be met in fiscal 1974," Rifenburgh concluded.

In the nine months ended Jan. 31, rental and service income comprised \$59.9 million of the total record revenues of \$104.4 million.

Equipment Sale

Also included in total revenues is about \$7 million from the sale

of rental equipment to Randolph Computer Corp. In the same year-ago period, revenues totaled \$87 million.

Earnings for the period totaled \$55,000 or 1 cent a share compared with \$1.6 million or 28 cents a share in the comparable year-earlier period.

"While the costs of establishing a broader systems rental base have now peaked in the U.S.," Rifenburgh stated, "This burden continues at MDS-International as a result of the accelerated marketing and installation of System 2400s overseas."

MDS has shipped 1,000 System 2400s and has a backlog of about 900 systems.

Strong 4th Quarter Turns STC Around

LOUISVILLE, Colo. — A strong fourth quarter helped Storage Technology Corp. finish the year with a hefty turnaround for the 12 months ended Dec. 29.

Earnings, including a \$1.4 million tax credit, totaled \$3.7 million or \$1.14 a share compared with last year's loss of \$4.1 million or \$1.53 a share.

Revenues soared to \$26.3 million from \$3.7 million in the previous year.

The fourth quarter benefitted from a lower-than-estimated effective tax rate, the firm noted, and earnings in the period totaled \$1.8 million or 51 cents a share compared with a loss of

\$231,000 or 8 cents a share in the year-ago period.

Revenues totaled \$9.1 million compared with \$1.9 million.

The firm also indicated third-quarter earnings were overstated by \$190,000, owing to overstatements of both revenues and costs and expenses. The revised figures are earnings of \$1 million and revenues of \$7.6 million in the period ended Sept. 29.

As of Jan. 29, 1973, the annual revenue value of company-owned equipment on rent was about \$13 million and STC had orders for the rental of additional equipment with an annual rental value of about \$5.7 million, the firm said.

Sycor Has First Profitable Year

ANN ARBOR, Mich. — Intelligent terminal maker Sycor, Inc. has achieved its first profitable year, with revenues 87% above those for 1971.

A strong fourth quarter contributed revenues of \$5.7 million and earnings of \$716,600 or 30 cents a share.

Year-ago revenues totaled \$2.9 million with earnings of \$38,700.

In the year ended Dec. 31, earnings totaled \$1.2 million or

47 cents a share compared with a loss of \$1.4 million or \$1.11 a share. In 1972 tax credit totaled \$570,000.

Revenues for the period soared to \$15.7 million from \$8.4 million in the previous year.

President Samuel N. Irwin noted the planning of "several years began to reach fruition during 1972 and the worldwide market acceptance of Sycor intelligent terminals has created the momentum for a continuing improvement."

New Registrations

DATA PROCESSING SECURITY, INC., 1674 Wolf Road, Wheeling, Ill., filed to register 180,000 shares of common. The proceeds, at \$3 per share, to be used for working capital. The underwriter is Jay W. Kaufmann & Co., 111 Broadway, New York, N.Y. 10006.

MOHAWK DATA SCIENCES CORP., Utica, N.Y., filed to register 368,048 shares of common, in connection with the proposed merger of Computing Efficiency Inc. into MDS-Bucode, Inc.

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E X C H	1972-73 RANGE (1)	CLOSE MAR 29 1973	WEEK NET CHNGE	WEEK PCT CHNGE
SOFTWARE & EDP SERVICES				
O ADVANCED COMP TECH	1- 3	1 3/8	- 3/8	-21.4
A APPLIED DATA RES.	3- 7	3 1/4	- 1/8	-3.7
O APPLIED LOGIC	1- 4	2 1/2	0	0.0
N AUTOMATIC DATA PROC	65- 99	75 1/4	+10 1/4	+15.7
O BRANDON APPLIED SYST	1- 2	5/8	0	0.0
O COMPUTER DIMENSIONS	3- 14	3	+ 1/4	+9.0
O COMPUTER DYNAMICS	1- 4	7/8	0	0.0

O COMPUTER NETWORK	2- 7	1 3/4	0	0.0
N COMPUTER SCIENCES	3- 10	3 7/8	+ 5/8	+19.2
O COMPUTER TASK GROUP	1- 2	1 3/8	- 1/4	-15.3
O COMPUTER TECHNOLOGY	2- 8	3 1/8	+ 1/8	+4.1
O COMPUTER USAGE	5- 14	5 3/4	+ 5/8	+12.1
O COMRESS	1- 3	3/4	0	0.0
O COMSHARE	5- 10	6 3/8	+ 1/2	+8.5

N CORDURA CORP	7- 28	7 1/4	- 5/8	-7.9
O DATATAB	3- 9	3 1/4	+ 1/2	+18.1
O EDP RESOURCES	1- 8	1 5/8	0	0.0
A ELECT COMP PROG	1- 5	1 1/8	- 1/4	-18.1
N ELECTRONIC DATA SYS.	43- 65	45 3/4	-1	-2.1
O INFORMATICS	3- 11	3 3/4	- 1/8	-3.2
O I.O.A. DATA CORP	1- 3	3/4	0	0.0

O KEANE ASSOCIATES	4- 7	3 1/2	0	0.0
O KEYDATA CORP	7- 13	7 1/4	- 1/4	-3.3
O LOGICON	4- 9	5 1/4	- 1/8	-2.3
A MANAGEMENT DATA	2- 10	2 1/2	0	0.0
O NATIONAL CSS INC	8- 41	31 1/2	-2 3/4	-8.0
O NATIONAL INFO SVCS	1- 5	1 1/2	- 1/8	-7.6
P ON LINE SYSTEMS INC	5- 19	15 7/8	+ 1/2	+3.2

N PLANNING RESEARCH	4- 17	3 3/4	+ 1/8	+3.4
O PROGRAMMING METHODS	20- 25	22 1/2	+1	+4.6
O PROGRAMMING & SYS	1- 2	3/4	- 1/8	-14.2
O RAPIDATA INC	5- 27	16 1/4	0	0.0
O SCIENTIFIC COMPUTERS	1- 4	1 1/4	0	0.0
O SIMPLICITY COMPUTER	1- 5	1 3/4	- 1/4	-12.5
O TBS COMPUTER CENTERS	3- 6	2 7/8	- 1/8	-4.1

O TCC INC	1- 3	1/2	0	0.0
O TYMSHARE INC	7- 12	7 3/4	+ 1/4	+3.3
O UNITED DATA CENTER	5- 8	5 1/4	0	0.0
N UNIVERSITY COMPUTING	7- 26	10 3/4	+ 5/8	+6.1
A URS SYSTEMS	6- 10	5 3/4	+ 1/8	+2.2

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O ADVANCED MEMORY SYS	12- 23	16 3/4	+2	+13.5
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O ANDERSON JACOBSON	4- 8	5 3/4	+ 3/8	+6.9
O BEEHIVE MEDICAL ELEC	1- 9	9 1/8	+1 3/8	+17.7
A BOLT, BERANEK & NEW	5- 21	9 1/2	- 3/8	-3.7
N BUNKER-RAMU	6- 14	6 1/2	0	0.0

A CALCOMP	9- 25	10 7/8	- 1/4	-2.2
O CAMBRIDGE MEMORIES	9- 15	11 1/8	+ 5/8	+5.9
O CENTRONICS DATA COMP	6- 28	21 1/2	+2	+10.2
O CODEX CORP	6- 25	12 1/2	- 1/4	-1.9
O COGNITRONICS	1- 5	1 7/8	+ 1/4	+15.3
O COMPUTER COMMUN.	1- 7	2 3/8	- 1/4	-9.5
A COMPUTER EQUIPMENT	2- 4	2 1/2	+ 1/8	+5.2

O COMPUTER MACHINERY	7- 13	9 7/8	+ 1/4	+2.5
O COMPUTER TRANSCIVER	2- 9	2 1/2	- 1/4	-9.0
A COMPUTEST	3- 9	4 1/2	0	0.0
N CONRAC CORP	23- 39	23 3/8	- 1/8	-0.5
A DATA PRODUCTS CORP	3- 7	3 1/8	- 1/8	-3.8
O DATA RECOGNITION	1- 5	2 1/2	0	0.0
O DATA TECHNOLOGY	2- 5	3 1/4	- 1/8	-3.7

O DI/AN CONTROLS	3- 8	2 3/4	0	0.0
N ELECTRONIC M & M	3- 8	3 5/8	+ 1/8	+3.5
O FARRI-TEK	2- 5	3 3/8	0	0.0
O GENERAL COMPUTER SYS	6- 16	7	+ 1/2	+7.6
N GENERAL ELECTRIC	59- 74	65 1/4	+1 5/8	+2.5
N HAZELTINE CORP	7- 13	7 3/4	+ 3/8	+5.0
O INFOTEX INC	14- 36	14	0	0.0

O INFORMATION DISPLAYS	1- 5	3/4	0	0.0
O INFORMATION INTL INC	8- 25	12	+ 1/4	+2.1
A LUNDY ELECTRONICS	6- 14	6 3/8	+ 1/8	+2.0
O MANAGEMENT ASSIST	1- 1	3/8	- 1/8	-25.0
A MILGO ELECTRONICS	15- 44	22 5/8	+1 7/8	+9.0
N MOHAWK DATA SCI	6- 27	6	-1 3/8	-18.6
O ODEC COMPUTER SYST.	3- 12	4	- 1/2	-11.1

O OPTICAL SCANNING	2- 16	5 1/4	+ 3/4	+16.6
O PERTEC CORP	5- 17	6 3/8	+ 1/8	+2.0
O PHOTON	3- 15	3 3/4	(SUSPENDED)	
A POTTER INSTRUMENT	6- 21	5 5/8	- 1/4	-4.2
O PRECISION INST.	2- 13	3 1/2	0	0.0
O RECOGNITION EQUIP	5- 15	5 1/2	+ 5/8	+12.8
N SANDERS ASSOCIATES	10- 21	10	0	0.0

SUPPLIES & ACCESSORIES

O SCAN DATA	2- 13	2 3/8	+ 1/8	+5.5
O STORAGE TECHNOLOGY	17- 39	23 1/4	+3	+14.8
O SYCOR INC	7- 11	10 3/4	+1 1/2	+16.2
O TALLY CORP.	7- 15	7 1/4	- 1/8	-1.6
N TEKTRONIX INC	34- 64	41 5/8	+5	+13.6
N TELEX	4- 15	5	+ 1/2	+11.1
O WILTEK INC	10- 26	14 1/4	+3 1/4	+29.5

O BALTIMORE BUS FORMS	5- 9	6 3/4	0	0.0
A BARRY WRIGHT	9- 14	9 3/4	+1 1/4	+14.7
A DATA DOCUMENTS	17- 26	19	- 1/8	-0.6
O DUPLEX PRODUCTS INC	8- 16	8	- 1/4	-3.0
N ENNIS BUS. FORMS	6- 10	6 1/8	+ 1/8	+2.0
O GRAHAM MAGNETICS	15- 27	16 1/4	- 3/4	-4.4
O GRAPHIC CONTROLS	10- 15	10 1/8	+ 1/8	+1.2

N 3M COMPANY	76- 88	85 1/2	+3 1/2	+4.2
O MOORE CORP LTD	42- 59	57 7/8	- 1/8	-0.2
N NASHUA CORP	48- 62	50	0	0.0
O REYNOLDS & REYNOLD	37- 77	46	- 3/4	-1.6
O STANDARD REGISTER	14- 20	17 1/2	+ 1/4	+1.4

E X C H	1972-73 RANGE (1)	CLOSE MAR 29 1973	WEEK NET CHNGE	WEEK PCT CHNGE
COMPUTER SYSTEMS				
O TAB PRODUCTS CO	14- 23	15 1/2	+ 1/2	+3.3
N UARCO	19- 28	20	+ 1/4	+1.2
A WABASH MAGNETICS	6- 11	6 3/8	+ 3/8	+6.2
N WALLACE BUS FORMS	21- 26	23 3/8	- 1/8	-0.5

N BURROUGHS CORP	147-244	239 3/4	+15 1/2	+6.9
N COLLINS RADIO	14- 27	24 3/4	+ 3/4	+3.1
N CONTROL DATA CORP	42- 78	45 7/8	+3 1/8	+7.3
O DATA GENERAL CORP	36-131	40 1/2	+5	+14.0
O DIGITAL COMP CONTROL	3- 25	3 1/4	- 1/2	-13.3
N DIGITAL EQUIPMENT	72-105	81 1/4	+2 1/4	+2.8
N ELECTRONIC ASSOC.	6- 13	6 1/4	+ 1/2	+8.6

A ELECTRONIC ENGINEER.	6- 14	9 7/8	+ 5/8	+6.7
N FOXBORO	23- 41	26 1/2	+1 3/8	+5.4
O GENERAL AUTOMATION	13- 55	34	+1	+3.0
O GRI COMPUTER CORP	2- 5	1 3/4	+ 1/8	+7.6
N HEWLETT-PACKARD CO	46- 94	85 1/2	+4 7/8	+6.0
N HONEYWELL INC	106-170	115 1/4	+2 3/4	+2.4
N IBM	333-451	438 3/4	+13 1/4	+3.1

O INTERDATA INC	7- 16	9 1/2	+1 3/4	+22.5
N MEMOREX	8- 38	8 1/2	-2	-19.0
U MICRODATA CORP	5- 10	7 1/4	+ 1/8	+1.7
N NCR	27- 38	30 7/8	+1 5/8	+5.5
N RAYTHEON CO	27- 47	30 1/8	+3	+11.0
N SPERRY RAND	30- 50	44 3/8	+2 1/8	+5.0
A SYSTEMS ENG. LABS	4- 16	5 1/8	+ 3/8	+7.8

N VARIAN ASSOCIATES	14- 22	15	+1 1/8	+8.1
N WANG LABS.	18- 61	20	+1	+5.2
N XEROX CORP	121-172	154 1/4	+1 1/4	+0.8

LEASING COMPANIES

A BOOTHE COMPUTER	3- 18	3	0	0.0
O BRESNAHAN COMP.	1- 3	1 1/8	- 1/8	-10.0
O COMDISCO INC	3- 18	13 1/4	+2 3/8	+21.8
O COMMERCE GROUP CORP	4- 11	4 3/8	0	0.0
U COMPUTER EXCHANGE	1- 3	5/8	0	0.0
A COMPUTER INVSTRS GRP	4- 14	4 3/8	- 1/8	-2.7
U COMP. INSTALLATIONS	2- 5	2	0	0.0

N DPF INC	5- 13	6 5/8	- 1/8	-1.8
M DATRONIC RENTAL	2- 4	2 1/8	0	0.0
A DECL INC	2- 10	1 5/8	- 1/4	-13.3
A DEARBURN-STURM	16- 26	18	+ 7/8	+5.1
A DPA, INC.	5- 8	6	- 1/4	-4.0
A GRANITE MGT	4- 11	4 3/8	- 5/8	-12.5
A GREYHOUND COMPUTER	5- 11	4 3/4	+ 1/8	+2.7

A ITFL	7- 12	7 7/8	+ 1/2	+6.7
N LEASCO CORP	12- 24	12 3/8	+ 3/4	+6.4
O LEASAC CORP	6- 15	7 1/2	+ 3/8	+5.2
O LECTRO MGT INC	1- 4	1	0	0.0
A ROCKWOOD COMPUTER	2- 7	1 5/8	- 5/8	-27.7
O SYSTEMS CAPITAL	3- 20	9	+1 1/8	+14.2
N U.S. LEASING	19- 35	24 3/8	0	0.0

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE

L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER

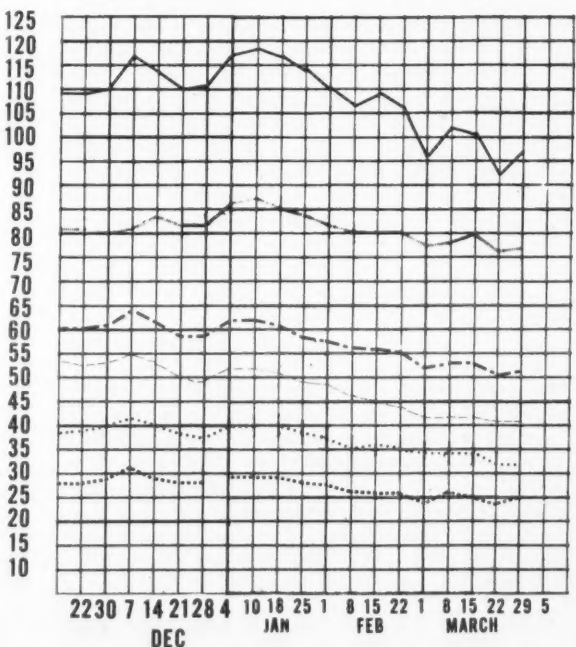
P=PHIL-BALT-WASH

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID

(1) TO NEAREST DOLLAR

Computer Stocks Trading Index

— Computer Systems — Software & EDP Services
 Peripherals & Subsystems Leasing Companies
 — Supplies & Accessories — CW Composite Index

Earnings
ReportsDATA-DESIGN LABORATORIES
Six Months Ended Dec. 31

	1972	1971
Shr Ernd	\$.21	\$.16
Revenue	4,876,648	3,787,135
aSpec Cred	20,700	33,500
Earnings	235,766	180,820

a-Tax loss carryforward.

KEYDATA

Three Months Ended Jan. 31

	1973	1972
Shr Ernd	\$.07	\$.02
Revenue	2,294,000	1,793,000
aTax Cred	95,000	20,000
Earnings	201,000	42,000
6 Mo Shr	.13	.06
Revenue	4,443,000	3,512,000
Spec Cred	a178,000	b110,000
Earnings	377,000	140,000

a-Tax loss carryforward. b-Tax credit and gain on sale of publication operations.

NATIONAL CASH REGISTER
Year Ended Dec. 31

	1972 (000)	1971 (000)
Shr Ernd
Revenue	\$1,557,699	1,465,701
Spec Chg	a70,067
Earnings	(59,612)	2,131

a-Mainly from the transition from mechanical business machines to new electronic products.

GENERAL COMPUTER SYSTEMS
Six Months Ended Dec. 31

	1972	1971
Shr Ernd	\$.22
Revenue	4,429,442	\$1,465,650
Tax Cred	170,209
Earnings	361,372	(409,905)

STANDARD REGISTER
Year Ended Dec. 31

	1972	a1971
Shr Ernd	\$1.45	\$.83
Revenue	109,199,879	108,001,959
Spec Cred	b165,133
Earnings	3,120,058	1,793,544
3 Mo Shr	.54	.18
Revenue	29,021,125	26,946,878
Earnings	1,162,790	388,292

a-Restated. b-From sale of real estate.

BRADFORD COMPUTER
& SYSTEMS

Year Ended Dec. 31

	a1972	b1971
Shr Ernd	\$.55	\$.36
Revenue	32,832,000	12,694,000
Spec Item	c57,000	d454,000
Earnings	1,970,000	1,160,000
3 Mo Shr	.14	.13
Revenue	9,579,000	3,168,000
Spec Item	d12,000	c31,000
Earnings	554,000	423,000

a-Includes accounts of Bradford Shareholder Services and BT Bradford Stock Services in which the company acquired controlling interests in January and April, respectively. b-Restated. c-Credit; tax credit less loss from conversion costs. d-Charge; loss from conversion costs less tax credit.

AMPEX

Three Months Ended Jan. 27

	1973	a1972
Shr Ernd	\$.35
Revenue	74,357,000
Spec Cred	2,781,000
Earnings	3,824,000
9 Mo Shr	.08
Revenue	221,206,000
Spec Cred	2,781,000
Earnings	940,000



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(LIKE DATA PROCESSING EQUIPMENT)



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